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ABSTRACT

The principal objective of this five-year longitudinal study was to determine the efficacy of employing the Omnibus Personality Inventory (OPI) and the American College Testing (ACT) program scores in designing a predictive model for identifying entering community college freshmen students' propensity to fall into one of three categories: successful completers, successful withdrawers (those who withdraw in good academic standing), and unsuccessful withdrawers. The study traced the academic performance patterns and achievement of 1,393 first-time day students in a California community college during their college stay, compared students' non-intellective characteristics to demonstrate the degree and dimension of differences between the three achievement groups, and analyzed characteristics that might be included in a predictive model. Comparisons between groups were made in terms of units attempted and completed, academic achievement and grade point average (GPA), academic probation and qualification data, number of terms attended, ACT and OPI response patterns, and normative national samplings. Findings indicated that although there were clear differences in GPA and ACT scores between groups, academic performance and persistence of the three groups was not accounted for by the test scores used in the study, and no one variable or combination of variables employed accounted for academic persistence. (TR)

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Predicting Community College Student Persistence

By

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A.B. (California State University, San Jose) 1952
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DISSERTATION

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ABSTRACT

The major focus of this study was upon the applicability of certain theories of Heist, Yonge, et. al. and their development of measures of intellectual, scholarly, attitudinal and personality characteristics as correlates of academic activity in college.

The principal objective of this research was to determine the efficacy of employing the Omnibus Personality Inventory and the American College Testing program scores in designing a predictive model for identifying entering freshmen students and their propensity to fall into one of three categories of students: successful completers, successful withdrawers, or unsuccessful withdrawers. The factors specifically tested were Thinking Introversion, Theoretical Orientation, Estheticism, Complexity, Autonomy and Religious Liberalism from the OPI scales and English, mathematics, social science and natural science sub-tests plus the composite scores from the ACT battery.

The criteria for appraising "successful vs unsuccessful" student academic achievement were grade point average and units completed. Determining the efficiency of predicting through the use of these variables involved the following steps: (1) employing an appropriate predictor technique; it was useful to this study that both a step-wise multiple regression and multivariate discriminant analysis be utilized; (2) determining from the multiple regression

and multiple correlation analyses those variables which would be most valuable input in a prediction equation; and (3) defining an appropriate formula which could be used for "identifying" future classes of incoming freshmen to give advanced data to counseling department personnel on the academic potential and needs of students as they enter their first college experience.

The study group. This investigation comprised a major part of a five-year longitudinal study of 1393 first-time entering day students in a California community college. The research traced the academic performance patterns and achievement of the students during their college stay; compared non-intellective characteristics of the students to demonstrate the degree and dimension of differences between three achievement groups; and analyzed those characteristics which might be included in a predictive model to identify in advance potentially successful or unsuccessful students.

Seventy-four percent of the sample were under 21 years of age and another nineteen percent represented ages 21-29; the modal age was 18. Women students comprised 40 percent of the group; 82 percent of the women and 90 percent of the men were single. Seventy-two percent of the sample students declared themselves to be university transfer students and 28 percent to be "career" students seeking only a two-year degree.

Compared with the freshman classes entering the study institution for four subsequent years (1966-69) in terms of ACT data, high school GPA, educational objectives, and other educational measures, the sample group was not uniquely different or extreme.

Further, on other factors measured by the ACT data gathering process, this group was indistinguishable from other students nationally who entered two-year or four-year colleges and universities from 1962 through 1965.

The study subjects were cast into one of three a priori groups identified as Persisters (n=517) who in five years completed the equivalent of an Associate in Arts degree [i.e. 60 units or more with a GPA of 2.0 or above]; Successful non-persisters (n=401) who withdrew in good standing prior to completing 60 units of study; and Unsuccessful non-persisters (n=475) who disqualified or voluntarily withdrew in probationary standing before completing 60 units of study.

Extensive comparisons between the three groups which were displayed in the study included (1) units attempted and completed; (2) academic achievement and GPA; (3) academic probation and disqualification data; (4) number of terms attended; (5) patterns of response to the ACT battery; (6) responses to the OPI instrument; and (7) several normative national-sampling comparisons.

Among many findings and conclusions of this research, these stand out.

1. Students who were ultimately unsuccessful failed dramatically to complete units attempted during each term enrolled, and withdrew early in large numbers. The two successful groups exhibited consistent similarity in academic achievement with successful non-completers receiving GPA's higher than those of successful completers.

2. Unsuccessful students were from the outset unable to perform well academically; two-thirds of all students on probation the first term were ultimately unsuccessful. No unsuccessful student earned grades above a "C" and unsuccessfuls represented only twelve percent of all students who received "C" grades.

3. Within this study's three groups, a clear difference in mean score distribution on ACT tests was evident. Unsuccessful students fell one standard score or more below all national two-year norms and further below four-year and college-bound norms. Successful students from both groups were significantly higher than all national norms on most sub-tests. ACT scores clearly establish valuable early information about student potential for college performance.

4. The analysis of data from the OPI scales used provided little basis for any meaningful response to student-differentiation research questions asked in the study. Continued use of the instrument is recommended, but most appropriately on a one-to-one counseling mode; its value in designing a predictive equation for college performance is questionable.

5. Given the nature of the sample population tested and the variables derived from the OPI and ACT instruments, neither the step-wise multiple regression analysis nor the multivariate analysis contributed to designing a statistical model for predictive placement of college students. Academic performance and persistence of the three groups is not accounted for by the test score differences utilized in the study. No one variable or combination of variables employed accounted for academic persistence.

6. The results of this study suggested--given the students and the institutional environment studied--that a variety of ability and personality characteristics examined did not distinguish among students who were to become successful completers, successful non-completers, or unsuccessful achievers. The study does not by any means exhaust the variety of characteristics and attributes which may and should be studied, however, and the need to search for ways to identify student needs early in their college career continues.

ACKNOWLEDGMENTS

The completion of this work marks the end of a lengthy period of formal study which has had a dramatic influence upon this writer and is the result of the support and concern of many people.

The advice and constructive suggestions of Dr. Leland Medsker throughout the entire process were well received, as was his constant implicit demand for qualitative and editorial integrity.

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Two articulate statistical advisors, Dr. Barbara Chicks and Dr. Laurence Harvey, brought into clear focus the classroom theory we had absorbed but never applied. Florence Sivila and Donna Belke devoted hours of their lives to preparing copy and manuscript.

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CHAPTER I

INTRODUCTION

Education beyond high school in the United States has become both a necessity in a highly technological society and one of the primary controlling social values. The extent to which formal higher education has been embraced as a means of expanding and enriching personal, social, and national goals is evidenced in part by the degree to which the pursuit of continued education, once an institutional activity surrounded by a legal framework and social pressures, has evolved into a prevailing cultural pattern.

The trend of the ratio of the number of college students to the total number of persons in the 18-21 age group has risen from 14 per 100 in 1939 to 46 per 100 in 1965, and is expected to reach 55 per 100 by 1974. The 1.3 million college students enrolled nationally in 1939 became 5.5 million in 1955 and will exceed 8.5 million in 1974. Enrollments of adults over 21 years of age have also significantly increased and the number of these new students seeking degrees is noteworthy.

Vast numbers of students, including many who a decade ago might not have been considered college "material," expressing a variety of needs of their own and their environment, have influenced often-massive changes in administration, curriculum, facilities, and program. With added awareness of the values of higher education by the increasing number of persons from many "new" segments of the society, increasingly taking advantage of these opportunities, comes increased responsibilities for educators and their institutions. Burgeoning college enrollments will require greater effort to obtain more accurate information about students so as to assist them into pursuits of value both to themselves and the social milieu into which they will move. This becomes especially true for the community college.

The unique character of the community college, being neither a four-year college nor a secondary high school, but a model of certain aspects and attributes of both, brings its peculiar distinctions—one significant distinction is in the admission of its students. The community college normally admits any post-high school applicant while many a four-year college is selective and defines its student population through the establishment of institutional norms and criteria for admission. The effect upon the community college is to create a heterogeneity of student population, while the subjectivity of the selection standards of four-year colleges reflects student, curriculum, and administrative dimensions different from the community college.

The increase in demand for educational opportunity over the years has been simultaneously accompanied by another phenomenon. Attrition rates of students in all colleges have become a national concern, especially in terms of the number of students failing to "complete" degree programs or the equivalent. The magnitude of the problem of students dropping out remains with us, despite the numerous studies since 1920 which have attempted to establish effective selection criteria and appropriate procedures for college admission, to isolate determinants of college success, or to probe the reasons for failure and withdrawal; despite tests and instruments to measure and predict intellectual and nonintellectual factors of success and failure; and despite follow-up studies and "reclamation" programs to return students to educational activities. The character of the community college and its student population compounds the incidence of and concern for attrition.

It is significant that this study deals only with two-year college students. With all the years of massive research conducted to study four-year students, one must accept with skepticism the general applicability of findings to two-year students and colleges. Patricia Cross (1968) notes that "Research on the junior college students is a new phenomenon..." and that traditional measures used to describe many college students do not actually fit the junior college student. Other researchers, too, have identified distinct differences in the two populations.

The attrition of community college students is difficult to interpret unless one acknowledges that the multiple functions of that college give logic to a multitude of defensible reasons for leaving. There are some who are "passing through" on the way to another institution or type of training; others enroll for a term or more with no intention of completing a two-year term and still represent the achievement of an educational objective; and still others are enrolled for brief periods of time for personal rather than purely educational intentions. Reliable data are simply not available to distinguish between "for cause" dropouts and those whose exits probably represent an unfortunate termination of all formal education in a higher education institution.

A California State Department of Education (1961) survey team acknowledged the uniqueness of the problem in this way:

> The junior college, because of its peculiar role, would expect to have a reasonably large drop-out rate. It is a people's college where all may come to pursue education beyond high school, to remove deficiencies, to find themselves, to gain educational maturity, to obtain another chance. Traveling such paths will result in a definite number failing to complete all requirements for graduation.

Dorothy Knoell (1960) quite properly charged that the literature on college dropouts contains ambiguities when research procedures lump together into the "dropout" category all students who leave college before obtaining a degree. She further posits that such research fails to distinguish between voluntary withdrawal and dismissal and fails to get at root causes in an attempt to prevent it, suggesting that more dropouts could be identified in time and in sufficient quantities to prevent much attrition.

The higher education segment with reason for greatest concern about attrition rates is the two-year community college. Because its "open door" is being characterized in many quarters as the revolving door, because of the wide diversity of persons eligible to attend the community college without having to meet specific admission standards, and because of the difficulty in maintaining contact with students who enter for diverse reasons and for various lengths of time, predetermined by personal motives, the two-year college, unlike its four-year counterpart, experiences unique difficulties in identifying and "typing" its students in a manner which allows these institutions to adequately serve their clientele.

To summarize, there is a uniqueness about the community college as an institution, about its students, about the incidence of heterogeneity of its students, and about the very nature of the persistence intentions and realities of the students, all of which argues that the segment of higher education with the greatest need for study of attrition problems is the two-year community college. The tragic fact is that despite the incidence of legitimate attrition mentioned above, many community college students leave for reasons other than lack of academic ability and with the capacity and innate ability to succeed at some two-year program. It is to this concern that the present project is directed.

I. Purpose of the Study

The purpose of this study was to establish a procedure for early identification of those students entering a two-year community college who may become non-persisters. The major thesis of the study was that it is possible to predict a potential for non-persistence in entering freshmen students and to differentiate between those students who may become either successful or unsuccessful withdrawals from college and those who will persist. "Successful withdrawers," for purposes of this study, were those students who received a grade point average at "C" level (2.0) or better but failed to remain in college--insofar as is known--to complete the equivalent of an A.A. degree; "unsuccessful withdrawers" were defined as students whose grade point average was below 2.0, or who were on probationary status or had been disqualified at the time of withdrawing from the college. There was an element of longitudinal investigation to the study in that students were followed through five years.

The research concentrated on identifying distinctive intellectual and non-intellectual characteristics which would seem to predict non-persistence in college and demonstrate that:

a. Measurably significant differences in personality, attitude and aptitude do exist between students who persist in college and those who do not;

b. Certain data and combinations of data on commonly-used admission and counseling instruments do have practical value as discriminatory predictive variables, can make a useful contribution to distinguishing between students, and can be predictors of non-persistence in community college.

A principal objective of the study was to develop discriminating equations which utilize as input certain scales from the Omnibus Personality Inventory (OPI) developed by Heist, et al., and the American College Test (ACT) battery. It was posited that these equations would possess sufficient discriminatory power to distinguish between the potentially unsuccessful withdrawal, the successful withdrawal, and the persister/achiever student.

II. Importance of the Study

The study has potential value to contribute to understanding the distinguishing characteristics of community college students, to contribute further to the already considerable body of knowledge about college student dropouts, and to spotlight certain criteria which will help identify in advance students who will require specialized counseling and guidance if they are to be beneficiaries of a valuable educational effort. Information so available could be of particular value to student personnel administration and staff to effect implementation of appropriate action programs which would increase the opportunity for students to modify, enhance, or re-evaluate their proposed college program of studies and their objectives at the institution.

With the specific discriminatory criteria clearly identified, a computer program can be designed in such a manner that admissions test responses from future entering students can be promptly tabulated, the equations applied, and those students who "match" the predictive model can be identified to receive appropriate attention.

An underlying motivation for this project lies in the belief that this is a time when college students are being increasingly handled in masses--in public and private life as well as on the campus--and college personnel need to learn more about students as individuals if they are to be effective in assisting them to successful educational efforts. The nature of the increasingly heterogeneous students who enroll into the two-year college must be better understood by college faculties and counselors, starting early in the students' college experience. The development of a better descriptive "profile" of entering students seems an important first step in what must be a long-range program to better understand them. It must be part of a program which colleges individually and collectively must undertake if they are genuinely disposed to develop procedures (a) to intercept students who will terminate prematurely their college plan, whatever its dimensions and tenure; (b) to take actions which will benefit the student body as a whole as well as subcultures and groups within it; and (c) to assist college registrants to make rational decisions about their college plans at enrollment time and later when alternatives to college are presented within and without the campus environment.

Ford and Urban write for Pervin (1966) of "The Constructive Implications of College Dropouts" to suggest on the one hand that it is"...more appropriate to modify the situation rather than the student's behavior in order to improve his chances for success." Further, they suggest, "Our college dropouts are trying to tell us something. Our total educational system is inadequate--there are some gaps in it." "We need to invent forms of education that are appropriate for the diversity of students who begin a college experience;" only then can institutional change involving faculty, curriculum, courses, teaching methodology, and other dimensions of the environmental press result in reducing college withdrawals. It seems reasonable to suggest that before we can "modify the situation" to improve chances for success, before we can invent appropriate new forms of education, before we can implement modest or widespread change, we must first know better the nature of the clientele.

III. Theoretical Framework for the Study

A major focus of this study is the applicability of certain theories of Heist and colleagues and their development of measures of intellectual, scholarly, attitudinal and personality characteristics as correlates of academic activity in college. These measured characteristics comprise the Omnibus Personality Inventory (OPI). Certain research questions and operational hypotheses are suggested by this Inventory and Heist's writings, and by the research findings of others utilizing the OPI to study college students.

A second concentration of this study is upon the effectiveness of data reported through the American College Testing (ACT) program battery as measures of the propensity for academic achievement. Like the OPI, only in recent years has the ACT been explored as a vehicle for measurement and prediction of college student behavior and accomplishment.

Heist and Yonge constructed within the OPI instrument (Manual, 1968), and subsequent to the initial exploratory and developmental/reconstruction stages of the Inventory, an assessment area or variable called the Intellectual Disposition Categories (IDCs). The system is "... a way of classifying or locating persons at certain points on a 'continuum' of intellectual disposition." It is a method of using several related scales (described in Pp. 94-5) which repute to be measures of those intellectual, scholarly and reflective-thought concerns assumed to be"... major modes or correlates of academic activity." Three of the scales are associated with the intellectual orientation: Thinking Introversion, which measures preference for reflective, abstract thinking; Theoretical Orientation, which measures a preference for dealing with problems and scientific method; and Estheticism, which measures interests in and response to esthetic stimulation and experiences. These are supplemented by "...a stylistic measure of perception..." called Complexity, which measures the extent of intellectual curiosity and tolerance for ambiguity. These four scales are further supplemented by two others; (Autonomy, a measure of personal independence in thought and judgment and general nonauthoritarian thinking, and Religious Liberalism, measuring fundamentalistic thinking, commitment, and attitudes related to religious beliefs.) The addition of these two scales serves to coordinate the measuring of a student's position in respect to authoritarian vs nonauthoritarian persons who (if scoring high) are at least cognitively, if not emotionally, "released" from their own subcultural pasts and are both less judgmental and more independent in thinking.

The function of the totality of the IDC measure is to ". . . assess a syndrome. . ." for intellectuality, for scholarly concerns, for a bent toward academic activity of a higher order. The index is a merging of the student scores which reflects his disposition to ideas, reflective thought, accommodation of abstractions and problem solving, and approaching of phenomena in an open and creative manner. The underlying theory is that such a system measures the student's probability for dealing with ideas and cognitive experiences with an openness for new experience, with personal autonomy and independence of both thought and judgment, and with a commitment to a more nonauthoritarian pattern of reasoning when the total formulation is applied.

The idea of using a related group of scales which measures the potential for behaving intellecutally was developed over several years and subjected to validity tests, expansion, retest, and modification, until, in its present construct, it provides a way to distribute test participants into one of eight "categories of intellectuality." It is the authors' contention that the distribution of testees reflects the variety of background experiences and the dissimilarity of orientations toward learning and scholarship.

While the idea of distinguishing among persons in this manner is not a concept unique with Heist and Yonge, it was among the original reasons for developing the Inventory; other researchers have advanced certain of these same personality measures as correlates of scholarly dispostion in other and different models. An increasing number of researchers have conducted and published studies employing the OPI instrument, some of which appear to yield further insight into its potential value as a descriptive and predictive device.

In his introduction to the OPI Manual (Form D), Heist (1962) notes that the theoretical bases upon which the OPI is foundad generally encompass ". . . the developmental nature of man and the social context in which current behavior occurs and growth and development take place." The family influence and home environment, the later social-cultural settings of life, and the academic culture and milieu are all important personal-social-learning with which Heist and Yonge have been concerned, both in the total OPI instrument and their IDC model.

Elaborating upon the broad scope of the development of a personality inventory insofar as a theoretical framework, Heist reports:

> One might assume that any personality inventory would be strengthened by an explicit, underlying theory, but it is also true that limiting an instrument to a specific theory of personality may be seen as overly restrictive, especially if it is to measure important characteristics of a variety of students enrolled in dissimilar institutions . . . consideration was given to some of the major attitudes, values, and interests which would, within the context of a general eclectic set of principles, shed meaningful light on the variations among students and student bodies. . . .

Heist later adds:

> . . . Both the accepted theory and available information permitted hypotheses about extensive variation among students. . . . It was also presumed that student Bodies, considered as groups, would vary significantly on the selected traits or characteristics with most variation in the area of intellectual interests. . . .

There are, indeed, variations in characteristics if one is to accept the findings and conclusions of the increasing number of studies employing the OPI as a measuring instrument. Unfortunately, application of the instrument to two-year community college students has been markedly less than to four-year students, and two precautions are essential in approaching the literature of research on four-year college students. The first is that generalizations based upon samplings of four-year college students—particularly those institutions which are highly selective—need to be approached with caution when applying them to two-year college populations. The second is that one must avoid over-simplification when focusing upon personality characteristics as explanatory variables of academic behavior. Lavin (1965) addresses this issue and advises that in such studies the specific personality variables are"". . . usually selected through common sense or a hunch that they might be related to academic performances. . ." rather than based upon a systematic personality theory. Of his own attempts to analyze the significant literature on personality research he states:

> Because the emphases are so eclectic, it is difficult to organize (his) review in terms of a systematic classification of personality factors. . . to do so would create a misleading sense of orderliness in the literature.

Our view is that studies of four-year institution students can serve as benchmarks for our purpose and that, in keeping with the implication of Lavin to seek value only from those measurements with substantiated quality, the OPI and the micro-sampling of IDC provides a legitimate and valid basis for founding the proposed study.

IV. Outline of the Study

This chapter identified the purpose of the study, the significant potential values of the study, and the theoretical framework upon which this study was developed.

Chapter II presents a review of literature pertinent to this study. Especially, focus is upon literature of research and investigation in education which has employed the Omnibus Personality Inventory and the American College Test program battery as the principal research vehicle.

Chapter III describes the background for this study, the institutional environment, and the nature and character of the study group.

Chapter IV discusses the academic performance of the study group during a five-year period of examination.

Chapter V analyzes the patterns of student response to the two appraisal instruments used in the study.

Chapter VI describes the two statistical procedures used in the study, displays appropriate data interpretation which these procedures generated, and evaluates the contribution of the methodology.

Chapter VII treats the testing of hypotheses.

Chapter VIII contains a summary of the study recommendations and conclusions.

Appendices follow the last chapter.

CHAPTER II

REVIEW OF LITERATURE ON STUDENT CHARACTERISTICS RESEARCH

This section directs attention first to an appraisal of the "environment" of student characteristics research, then to an identification of some specific studies reported in the literature which are appropriate to the central purpose of this project.

Prediction and Persistence Studies. Since the early 1920's collegiate institutions have gathered data on students. Biographic and demographic information, emotional adjustment, interests, reading ability, high school grades, and scores from aptitude and achievement tests are all factors which have been employed in an effort to try to predict students' success, failure, or achievement in college, such "success" or "failure" frequently being measured in terms of grade averages compiled, units completed, or years attended. Fishman and Pasanella (1960) reported that nearly 600 such formal studies were catalogued during the 1950's alone, with perhaps as many more unreported studies accomplished by collegiate admissions officers in the course of their regular institutional duties.

In the overwhelming majority of predictions studies, the best single predictor of college grades has been found to be high school grades, with achievement test scores and aptitude test scores being slightly less reliable as predictors. Bloom and Peters (1961) report that when employed singly, each of these three factors will ordinarily correlate with first-year college grades within a range of +.40 to +.60. Used in combination, two or more of these factors will correlate with college grades within the +.55 to +.65 range. These ranges of predictive efficiency remained practically unchanged over the four decades since 1920.

In her review of research on collegiate dropout problems which had been conducted from 1940-1955, Matson (1955) suggested that "The historical emphasis . . . has been on causes of dropout rather than on identification of the characteristics of students..." and leaves many questions unanswered. She concluded that "It is perhaps more important that each institution undertake to discover those personal, institutional, and community factors which relate to this (Attrition) problem in its own setting."

Merrill (1964) echoes, in part, Matson's concern:

> For many years, institutional research of students was characterized by the effort to raise the level of prediction by adding, often indiscriminately, more and more easily administered tests. . . . In reviewing the literature. . . one may look in vain for studies which looked deliberately and closely at individuals who were missed by the actuarial prediction. . .to either determine what other factors may have been operating. . . or, perhaps more importantly, to determine what changes might have been made within the institution to increase the likelihood of student success.

Summerskill (1962) charged, after his analysis of an extensive body of literature seeking answers to questions of why students do not persist in college, that the research efforts have yielded neither adequate nor conclusive answers, despite the scores of thoughtful and well-designed studies carried out at various colleges plus two major federal agency studies (McNeeley, 1939 and Iffert, 1954). Nevertheless, he suggests, attrition research has suggested a number of factors or dimensions other than ability which seem to be closely related to the questions of persistence and attrition, and ought to be pursued.

Sexton (1965) identified nearly 200 separate investigations and studies of student persistence conducted during the quarter century from 1933 to 1958, concentrating broadly on studies of the analysis of intellectual and non-intellectual factors influencing college achievement and attrition, the predictive value of these factors, types of institutions attended by successful _vs_ unsuccessful students and different methods of handling poor scholarship when predictive measures and methods are attempted. Characteristic of other reviews of the research into college student persistence which have been pessimistic in summarizing findings, Sexton concludes from her analysis that evidence "...on the relationship between personality and academic success or failure is inconclusive. . . and fraught with inconsistencies. . .", and that conflicting evidence over so many years ". . . serves to emphasize the enormous complexity of the college drop-out problem and the improbability of developing universally applicable methods of prevention and cure."

Treatment of "dropouts". Frequent estimates of the numbers and percentages of entering college freshmen who will receive degrees after four years are advanced by persons representing a variety of institutions, interests, or causes. While regional or institutional or disciplinary "noise" influences the statistics, general agreement is that only 40 percent of entering freshmen will so graduate.

There are optimistic appraisals. Eckland (1964) suggests that if the time line is extended far enough, the total number of college graduates might reach 70 percent in any class. Pervin's (1965) study of Princeton University classes of 1940, 1951, and 1960 compared dropouts and non-dropouts for several purposes. Among his findings were these: (a) the number of "dropouts" who returned to college equaled 50 percent for the class of 1940, 82 percent for the class of 1951, and 97 percent for the class of 1960; (b) the percentages of these "dropouts" who eventually graduated were respectively 53, 74, and 99 percent.

In a longitudinal study of the University of Utah class of 1948, Jex and Merrill (1962) noted that of an entering class of (n=1943) students, 34 percent of the female and 52 percent of the male students had graduated by 1961 and that as many as 60 percent of the class will eventually graduate.

Dorothy Knoell (1960) pointed out a prevalent limitation in attrition studies; the practice of combining into the "dropout" category all students who leave college before attaining the (bachelor's) degree and thereby failing to properly distinguish between students. Such a practice fails to distinguish between the student who drops out due to academic limitations and the one who decides to transfer to another institution, to interrupt his education for any number of valid reasons, to terminate his formal college education because he has met a specific short-term objective for which he originally enrolled, or for a variety of other valid reasons not to continue. Rose and Elton (1966) cite the finer distinction of the mid-term withdrawer who may have completed an "educational goal."

Jex and Merrill (1962) note the problem of classification historically:

> Since WW II a changing pattern of higher education has emerged. One major facet of this pattern is the shift from "dropout" to "interruption" of academic goals... most dropout studies of the past seriously underestimated the persistence of students in achieving academic objectives.

The term "dropout", then, is most often applied to students who—for whatever reason—withdraw from the institution prior to graduation. This is not a true dropout since many students are known to transfer and return, but the nature and the extent of such transfer/return students is poorly understood and cannot be adequately documented in most studies.

Ecklund (1964), who distinguished between withdrawal for cause and academic deficiency, described significant differences in personality dimensions between the student who interrupted his program and returned, and the student who was a permanent dropout. By contrast, Ivey _et_. _al_. (1966) followed Ecklund's approach and found _no_ significant differences between voluntary and dismissed withdrawers. Vaughan (1968) sides with Ecklund and Knoell and takes figurative issue with Ivey _et_. _al_. in a study to investigate the effect of classifying under the common category of "dropout" each of those student groups (voluntary and dismissed), so as to compare a total sample with the two subgroups and with the persisters. Based on both cognitive and non-cognitive instrument testing, Vaughan suggested significant differences. "A more accurate evaluation," reports Vaughan, "would describe those. . .dismissed for academic reasons as more limited (in cognitive skills) and those who withdrew (for nonacademic reasons) as approximately equal to. . .persisting students."

Addressing the need to clarify dropout statistics, Coplein (1962) calls for a national clearing house system to "follow" students from one institution to another or to a job site. He also calls for separate studies of voluntary dropouts vs those out for probationary, academic, or disciplinary reasons.

Chambers (1961) advanced what has come to be a more common suggestion than it was a decade ago: He proposed that the community college become a "proving ground" for all high school graduates and cites the advantages of the two-year system both for the student and the four-year colleges and universities.

College Retention, Transfer, and Graduation. Although the number of studies done in the general area of college retention, transfer, and graduation are legion, the scope of such studies has typically been quite narrow, being limited for the most part to institutional studies which concern themselves with the students who enroll originally as first-time freshmen and who persist through graduation at the original institution.

While a retention study of an institutional nature provides the individual college or university with some measure of its own efficiency and productivity, the sociological value of such a study is limited, since it does not take into consideration the numbers of its own students who transfer elsewhere and graduate;

nor does it typically involve the students who transfer in from other institutions. Coffelt and Hobbs (1964) suggest that "since the rate of mobility among modern college students is considerable, any study of retention-graduation which does not take the transfer factor into consideration is calculated to understate the rate of gross retention in the society by 20 percent or more."

In analyzing retention/attrition research, one experiences the greatest difficulty in gaining "authoritative concensus" in validating the interpretation of cross-sectional data "measuring" or "identifying" persistence and attrition of students. Some projects which set out to help "clear the air" admit they arrive at no conclusive correlation with any previous position.

A great number of studies at the college level have been limited to "psychometric comparisons" between freshman-level-only students who did or did not drop out, rather than to larger population samples. (Astin, 1964)

lffert (1958), in a landmark study and resume, leads one to conclude it is well established that dropouts--compared with persisters--tend to be less able and performed less well in high school; he is supported by many who use a variety of measuring instruments of both cognitive and noncognitive traits, and conclude that the high school GPA is the best indicator of college performance. Yet this position is refuted by implication by a considerable body of additional research which supports the proposition that personality variables, environmental press and institutional uniqueness often unrelated to any past performance, differentiate between persisters and withdrawers at the college level.

While agreement extends to the fact of psychological and non-intellectual differences between persisters and dropouts, the specific nature and degree of these differences is less clear, which can perhaps be explained in part by the varied nature of the several instruments and their descriptive powers, by the institutional press and environment, by the demand placed upon students, and other variations.

Summary. Literature on the college dropout, on national attrition, and on college student performance indicates a mosaic of reasons, intellectual and non-intellectual, which contribute to the national college dropout phenomenon. The great bulk of the studies conducted the first half of this century devoted attention to cognitive and intellectual aspects of individuals and groups and, more often, to assisting those who persist. There is a growing body of research and literature which now treats non-intellectual factors and—with increasing frequency—focuses upon the student who does not persist.

There is little doubt that many students with academic potential do not continue college studies long. There is also little doubt that other students need to redefine their objectives and goals for attending college so as to be able to achieve more realistically and not become—literally—failing withdrawers. If, early in the matriculation process, students could complete certain measurement and test batteries which in turn provide administrators and counseling staff with indicators of those students (1) who have potential for achievement but will probably leave and (2) those who have little potential and will probably leave with unfortunate poor records, corrective measures could be initiated.

The extensive literature on student persistence, attrition, and prediction is important to America's higher education. The studies which have been conducted can be initially sorted into three categories of philosophical, descriptive, and predictive studies, then can be subdivided into various configurations. The sharing of findings and the replication of processes can be accommodated to advantage. But all of this activity and endeavor is an arbitrary and frequently static exercise in defining the past.

What is urgently needed--and has been sought by many researchers--is a workable predictive-criteria model for processing data known about students as soon as they enter an institution, thereby defining their "potential profile" of future performance. In stating this objective, however, it is imperative to firmly establish that no simple "model" or scheme will be universally applicable because of institutional, individual, and sociologic distinctives which attend every institution. If, however, a workable model can be empirically formulated and applied with measurable and definable success at a single institution, it is highly possible that it can be modified to accommodate for the distinctives of another institution and, through controlled application, effectively implemented.

A REVIEW OF RESEARCH UTILIZING THE OPI

The Omnibus Personality Inventory (OPI) Form D (Center 1962) is an attitudinal inventory of nearly 400 statements arranged in twelve (now fourteen) scales; initially developed for use with college populations, it is now published for other applications. It was developed to assess personality characteristics among normal and intellectually superior college students.

The twelve scales were constructed to assess characteristics of human behavior within areas of normal ego functioning and intellectual activity. Scales included Thinking Introversion (TI), Theoretical Orientation (TO), Estheticism (Es), Complexity (Co), Autonomy (Au), Religious Liberalism (RL), Impulse Expression (IE), Social Alienation (SA), Social Introversion (SI), Anxiety Level (AL), Masculinity-Femininity (MF), and Response Bias(RB).

The Omnibus Personality Inventory has become an increasing source of information on student characteristics since its publication in the early 1960's. It has replaced in some research, and supplemented in others, the use of similar instruments including the Minnesota Multiphasic Personality Inventory (MMPI), the Gough Adjective Check List (GACL), the California Psychological Inventory (CPI), the Inventory of Beliefs, the Differential Values Inventory, the Bell Adjustment Inventory, and others. The OPI is frequently "combined" with aptitude and achievement instruments both to test the validity of its powers of discriminant analysis and to measure closeness of variance from another instrument's norms. While it has been used in some "massive" studies of large numbers of students on a regional or national basis, it is particularly suited for local campus and institutional administration and interpretation, frequently for preadmission evaluation.

Most investigations reported in the literature deal with students in highly selective universities and state colleges; few studies are devoted to community college students and their problems, and then usually in dimensions or manner not compatible with the needs of this study. Only recently have such studies been conducted and their reporting seems limited to in-house publications. Both Knoell (1966) and Knoell and Medsker (1965) publications point out the need for studies of students and action programs in the two-year colleges.

Cohen and Brawer (1969) studied 259 entering freshmen junior college students using the OPI (and one other instrument) to appraise personality characteristics which might relate to dropout tendencies. When the study subjects were compared both with University of California freshmen samples and with normative samples, scores showed significant discrepancy between the junior college student and normative samples of TI, TO, Es, and RO scales (among others), and significant discrepancy between the sample group and U.C. freshmen on TI, TO, and Au. Lower scores on TI and TO, particularly, marked the sample as less oriented toward academic interests than either of the comparison groups.

Cohen and others (1969) also studied the same group seeking distinguishing characteristics related to dropout tendencies. Although no findings of major significance evolved, the differences which were found between dropouts and persisters were best marked by scores on the OPI Complexity scale. The fact that students scoring high on Co scale were more likely to drop out than those who scored low was said by Cohen to corroborate ". . . findings reported in a study of UCLA freshmen. . .", by William F. Hessel, and Trent and Medsker findings (1968).

Hessel, writing in the 1965 Mental Measurements Yearbook, cited findings of his study of 340 male and 387 female UCLA freshmen using the OPI. Those who scored high on the Impulse Expression and Complexity scales had a significantly higher dropout rate than those low on the same scales; further, those low on the Autonomy and Thinking Introversion were more likely to be dismissed by the college. The findings are consistent with those of Trent and Medsker (1968) whose study-group withdrawals had higher mean scores on the Co scale than did the persisters, [". . . although differences were not statistically significant."]

Studying an admittedly unique and diverse freshman population (n=721), Snyder and colleagues compared Massachusetts Institute of Technology students on the TI, Co, and IE (Impulse Expression) scales. Snyder (1968) noted that students scoring high on TI, Co, and IE are more likely to leave the institution than low-scoring students. Snyder also found "a highly significant and positive association" between all three scales of these OPI and the SAT Mathematics subtest, and a "significant relationship" between the TI scale and the SAT Verbal subtest. Thus, in Snyder's study, those students who withdrew either voluntarily or disqualified were high scorers on the three scales (two of which are in the IDCs). This latter fact is not surprising but, rather, supportive of awarenesses by college administrators that many academically able, capable, and talented students abandon their college careers—some temporarily and many permanently. Heist (1968) found that a large proportion of the most creative students drop out, and Medsker and Trent suggest the reason may lie in the absence of a sufficient amount of intellectual stimulation.

In an early application of the OPI, Cope (1968) measured all incoming freshmen at the University of Massachusetts in 1962 and 1963 with seven selected scales, and studied attrition patterns two years later. Sampling 565 dropouts and 730 persisters, Cope found that low scores on scales which significantly distinguished dropouts from "stay-ins" were Religious Liberalism, Estheticism, and Theoretical Orientation. By sex, only the RL scale clearly related to dropouts among males and only Es and TO related to female dropouts.

Utilizing the Allport, Vernon, Lindzey (AVL) Study of Values, Heist (1968), in reporting on creative students, displayed samples of student "typing" in a longitudinal study of National Merit Scholarship winners. Focusing on a group of science students from a highly selective school, Heist found patterns of scores for dropouts who achieved high grades vs those of average and low achievement showed "Most high-achieving students. . .significantly above the normative mean on the Theoretical and Aesthetic value scales...

and considerably below the mean on. . .Religious scales." (Note: Each of these scales correlates with the Complexity scale portion of the IDC index.) Heist draws an "almost identical" pattern for those dropouts with data reported by MacKinnon (1968) ". . .as typifying the values of recognized creative adults in several different fields."

> [Discussing creatives, Heist feels that based upon the scales of the OPI, the intellectuality of the creative student is somewhat different even from that of students identified as scholars. The scholars have higher scores on both TI and TO scales, and while the theoretical and analytical orientation is not absent among creatives, these individuals give priority to esthetic sensitivities.]

Gottsdanker (1968) explored the differences between the upper ten percent of an entering freshmen class and a random sample of the rest of the class. OPI results showed that the able group scored significantly higher on scales related to intellectual commitment, abstractions, and desire for independent thought (as reflected on her data for complexity, autonomy, estheticism, theoretical orientation, thinking introversion, and three other scales). Honors women received "significantly higher standard scores" in almost all categories than male groups in Complexity and Nonauthoritarianism; the two groups of men had almost parallel scores.

In a different "diverse group" study, Dispenziere (1967) compared business administration students with a normalized random sample of students (n=247 and 2390 respectively) to determine whether differences in personality exist among students at several levels of ability and achievement. Using OPI scores, SAT scores and comparing two years of academic performance (i.e., grades), he found "significantly different scaled vectors" for levels of ability demonstrated by business majors. He concluded that it is possible to "clearly distinguish" among students and to build "a model to predict potential achievement" based upon OPI scales.

Rossman and Kirk (1969) reported the result of a project involving students enrolled as freshmen at the Berkeley campus of the University in the College of Letters and Science in the Fall of 1966, working with sampling group data of persisters (n=1852), voluntary withdrawals (n=214), and failures (n=258) after their first year. The three instruments employed in the study were the OPI, SCAT, and a student questionnaire. Comparing the persisters with the withdrawals, differences were found on seven of the fourteen scales for both men and women. The differences noted on Es, TI, Co, and Au scales suggested that both male and female withdrawers are:

> . . .more likely to enjoy reflective or abstract thinking. . .more interested in artistic activities; tend to be more tolerant of ambiguities and uncertainties. . . more ready to express their impulses and to seek gratification in conscious thought or action.
>
> Male and female withdrawers are less interested in the practical and applied and are more intellectually oriented.
>
> Female withdrawers seem to express a greater need for independence than did persisters.

One who reviews this study and the 1966 study by Rose and Elton finds contradiction, for in the Rose study the voluntary withdrawal freshman are more hostile and maladjusted and less interested in the scholarly pursuits than the persisters on the same campus, yet not so this Berkeley campus study.

Rose and Elton have utilized the OPI in several different studies of students. Reporting in 1966 their investigation of differences between students who withdrew, successful persisters, and unsuccessful persisters, compared with students who simply failed to return a second year (dropouts) despite good academic standing, they concluded that voluntary dropouts are "clearly different in their personality structures. . ." from defaulters. [Students who voluntarily dropped out were more hostile than persisters or defaulters and showed more maladjustment, were least interested in literature, art, and philosophy, and tended to be more illogical, irrational, uncritical in problem solving, and disliked reflective and abstract (Scholarly Orientation) thinking pressures.] They further noted that persisters above "C" grade level exhibit different personality organization from those below "C" average persisters and that personality characteristics do significantly differentiate between withdrawals and persisters.

Rose (1965) investigated freshmen students at the University of Kentucky in 1963 who voluntarily withdrew within the semester using 60 males from the College of Arts and Sciences whose ACT scores placed them at or above the national mean entering score. (The use of the ACT to supplement OPI scores was an attempt to eliminate academic inability as a variable.) Defaulters were compared with randomly-selected persisters of the same class.

Superimposed upon the study was the division of the prospective defaulters into two groups, one required to have individual counseling interviews every second week and the other group receiving no counseling. Among Rose's findings was (a) the apparent deterrent effect of counseling; (b) that "while the defaulter resembles the successful persister in amount of anxiety", he differs from both the successful and unsuccessful persister in interest, social skills, and acceptance of authority.

Efficacy of Predicting Performance with Personality Measurement. It was previously stated that many have advanced the notion of studying, analyzing, and grouping personality correlates as a possible measure of intellectuality and cognitive achievement; yet disparity attends. Lavin, in his expanded survey for the Sage Foundation (1965), reports on a large number of researchers' projects designed to learn whether certain personality dimensions relate to academic performance. Lavin firmly concludes that measures of independence (alternately labeled "autonomy" or "self-sufficiency") show considerable promise of being useful predictors of academic performance, and independence as a personality trait is positively related to academic performance.

Yeomans and Ludin (1957) also proposed that personality adjustment comprised one of the most influential factors affecting academic success, using the MMPI to demonstrate significant differences between top and bottom quartiles of freshmen and senior subjects.

During this same time, Stern, Stein, and Bloom (1956) commented on academic achievement forecasting in this manner:

> It is generally assumed that, although much of the variance of scholastic achievement can be accounted for by intelligence test scores and/or reading test scores, there remains a substantial portion which cannot be explained on the basis of these factors. It follows that some factors other than intelligence test scores and reading scores influence the ability to predict scholastic achievement.

In 1953, Gough suggested that sufficient empirical justification existed for including non-intellectual factors in predicting student academic behavior, despite his belief that—thus far—attempts to predict effectively by using personalogical factors had been relatively unsuccessful. He generally attributed the failures to the fact that many of the earlier studies were simply not properly designed to forecast academic adjustment.

At the close of the 1950's, Fishman (1959) expressed little optimism about the use of non-intellective variables in designing academic prediction models to the end of making productive use of them; yet he did acknowledge their importance. "If we cannot put such factors into our predictive equations," he noted, "then we must expect that they will tend to operate so as to upset our predictions in one direction or another. . ."; further, he suggests educators and researchers must ". . .appreciate the fact that the very core of the college experience and the very heart of a college's responsibilities revolve about these non-intellective factors. . ." and must remain contingencies in prediction and selection processes.

McConnell cautioned that correlational gains have not been impressive when non-intellective measures are combined with intellective measures. McConnell (1959) noted that ". . .both the intellective predictors—grades or aptitude scores—and the intellective criteria—persistence or grades—have caught up in them some of the factors of interest, motivation, persistence, effectiveness in studying, and the like, and are tapped in the non-intellective measures that are added to the predictive battery."

A BRIEF REVIEW OF RESEARCH UTILIZING THE ACT INSTRUMENT

The American College Testing (ACT) program was chartered in 1959 and its rate of growth has been rapid. Over 300,000 college-bound students sat for the four-part ACT in 1961-1962 when more than 700 colleges and universities recommended or required the tests. During 1962-1963 there was nearly a 15 percent increase in the number of students taking the test and 100 additional institutions joining the program.

"Through 1965, very little data on the ACT tests was discussed in the major professional journals," note Foster and Daskin (1965), "and increasing reports of studies and research on the use of the ACT batteries has been sporadic and varied in purpose." Although now widely used by colleges and universities, the availability of tests on a nationwide basis delayed the appearance of most validity data and studies.

The ACT Composite is the average of the standard scores for the four subtests of educational development included in the

ACT battery. These four tests measure the student ability to perform academic tasks required by college courses in English, mathematics, social science, and natural science. At the time a student sits for the ACT examination, he is asked to report his most recent term grades in those four subject areas (excluding senior year grades). Previous research has established that those grade reports by students are generally accurate and correlate well with high school rank reports.

The American College Testing Service battery has been the subject of investigation and testing just slightly longer than has the OPI, having come into somewhat limited use in 1961 and expanding thereafter throughout the nation. The ACT instrument, designed to measure ". . .the ability of a student to perform those intellectual tasks he is likely to face in his college studies," (ACT 1965) frequently is used in conjunction with other instruments, and for a variety of reasons.

Use of the ACT scores, either as a single instrument or in conjunction with other measures, is common in the research and literature and student personnel work. While broad concurrence as to predictive value of any portion or total measurement of the ACT instrument is difficult to establish (as might be expected of any test instrument), the majority view supports its use as valuable following analysis of the predictive validity of ACT results at 85 junior colleges throughout the nation which had experience with the instrument. Hoyt and Munday (1966) reported,

". . .ACT data have highly acceptable validity for predicting academic success in junior colleges."

Personality characteristics devices have been used for the purpose of predicting, describing, analyzing, and comparing students in terms of personal potential and future productivity and performance, and those studies have often utilized such aids as the ACT to establish base-measured ability. There are many other studies, however, which give the ACT battery a position of primacy in predictions and forecasting. More often than is true with personality batteries, the ACT tests are used in "isolated discipline" studies (i.e., "Predictive Value of the ACT in Determining Potential GPA in Highly Motivated Animal Husbandry Students"), yet the most frequent application is to entire institutions or total class samples. Opinion regarding the value of the ACT instrument is cited below by a small but representative sampling of the literature.

Kahnk (1966) conducted one of the initial studies of predicting college persistence utilizing the ACT as the prime variable studying 357 male and 328 female entering freshmen at Midlan College from 1961 to 1964. He established as a dependent variable whether or not students re-enrolled the following fall and, as independent variables, the ACT scores, high school data, and some traditional SES factors. His findings suggest that of all these data, only two are effective predictors of persistence and of college success, and for both men and women; one of the two is ACT scores. Kahnk urged further experimentation and testing with the ACT and other pertinent and potential predictive data, especially for the two-year community college. "Loss of students through withdrawing during a semester is dysfunctional for the junior college" he notes; "it increases per-student costs, adversely affects public attitude toward the college, and may result in the college diffusing its curriculum, standards, and operational pattern." He calls for early identification of potential dropouts and early counseling/guidance. Kahnk's implications for counseling as a deterrent coincided with those of an earlier Rose study (1965) of "defaulters."

In an extensive study of over 13,000 entering freshmen students in thirty public and private two- and four-year colleges and universities in Oklahoma, Coffelt and Hobbs (1964) employed the ACT as a device to "type" students in a longitudinal study. Investigating students in terms of biographical, sociological, and demographic characteristics, plus high school background and ACT, and ACT college normative data, they observed that differences in the dropout of high ability and low ability students are substantial. Nearly one-half the students who scored in the lowest quartile on the ACT dropped out during the first two semesters, whereas less than one fourth of those scoring in the highest quartile dropped out. The Regents summarized, "The characteristic which correlates most closely with persistence. . . is student aptitude, as measured by students' scores on the ACT battery.

In a massive study of over 213,000 students tested nationally, and reported in sophisticated statistical models and analysis, Munday (1968) writes of the potential for predicting college grades using ACT data. Among his findings, two are appropriate to this study. (1) Both ACT scores and high school grades possess useful predictive validity and are more efficient when used to supplement each other. (2) Predictive validity for either ACT or high school grades, or the combination of both, should be established separately for each college. These findings were not inconsistent with his earlier (1965) comparative study of the predictive advantages of the ACT, SAT, and SCAT, as used in 21 colleges and universities throughout the nation.

Van Erdewyk's (1967) study of 430 Engineering students in North Dakota utilizing the ACT, high school and college grades, and certain demographic data found significant value both in use of the ACT scores (math, social science, and composite), and high school grades.

Black (1969) reports on the efficiency of the ACT as a predictor of achievement at a Maryland junior college utilizing a multiple regression equation comparing persisters, withdrawals, probationary students, and academic dismissals. Black found that the equation utilized in predicting grade point averages was effective in at least three of every five GPA's within plus or minus one standard error for freshmen and three of five GPA's within plus and minus one standard error for sophomores. The equation was successful in identifying two of every three students who were placed on probation and four of every ten who were academically dismissed. Black concluded that the possibility existed for prediction with reasonable accuracy of both grades and potential dropouts and probators.

In a California study, Zimmerman and Michael (1967) compared the "criterion-related validities" of the ACT, and SAT, and the Guilford-Zimmerman Aptitude Survey, and found results in favor of the ACT battery. Using the entering freshman class at California State College Los Angeles in 1962 and 1963 (n=823) to test the then-new ACT battery, they concluded: (1) "In general, the inclusion of the ACT scales in the composite of the high school achievement and ability measure added more to the predictive validity than did. . .either of the two portions of the SAT or the two subtests of the (G-ZAS) in combination with the high school GPA;" (2) The addition of ability tests to the measures of high school achievement ". . .yielded a higher degree of relationship" than afforded by a single index of high school achievement alone as a predictor of achievement.

Demos and Weijola (1966) differ in their findings from Zimmerman when working with high ability college students. Addressing the general question of the use of achievement and persistence criteria with selected participants in special honors programs, and working with a small sample of (n=42) honors nominees and (n=44) eligibles who refused honors programs, the researchers used as achievement variables the ACT composite score and high school recommending units (A & B grades), plus certain personality variables from the CPI instrument. Their major conclusion was that predicting college GPA and successful completion ". . .is problematical. . .and that high school grades and ACT composite scores are of little value in selecting participants for special honors programs."

Lins et.al. (1966) likewise takes a dim view of the predictive value of the ACT as well as the SAT. In a study of 3700 entering freshmen at the University of Wisconsin in 1962, all of whom sat for the ACT and +1350 for the SAT, Lins' purpose was to determine the relative usefulness of scores of the ACT, SAT, and CQT in forecasting academic success during the first semester, for establishing a "cut-off point" for applicants, and other applications. Their findings suggest that (1) only a limited relationship exists between the ACT, SAT, or CQT and first semester academic performance as reflected in the GPA; (2) that none of these scores alone appear to be a predictor of high validity.

Passons (1967), in his report of nearly 900 Fresno State College freshmen in 1963 assessed by the ACT, SAT, and selected high school grades, concludes that high school recommending grades yield the best predictive validity of first year grades in college, and that neither the ACT or SAT clearly surpasses the other in predictive power.

Wisconsin State University, Stevens Point (1962) conducted a study to determine the usefulness of high school percentile ranks and the ACT composite standard scores in predicting the first-year academic success of freshmen entering this four-year college. The test population was the 2171 freshmen class of 1968 of whom 424 were dropped for failing after two semesters. It was concluded that while the high school percentile rank is closely related to college success and is a good predictor of student quality, the ACT scores are limited predictors and should not be used as the single criterion for entrance admission. There was also doubt as to the predictive capacity of the ACT insofar as academic suspensions despite the fact that a suspension rate of 20 percent or more was observed for all groups of ACT scores below 23 but ". . .relatively few students were suspended who had ACT composite scores of 23 or higher."

Foster et. al. (1962) attempted to determine predictability of course grades with the ACT subtests in an Agricultural University in 1960. Analyzing ACT scores for the freshmen enrolled in all courses with enrollments of 100 or more students (nine different course titles) the researchers applied multiple regression techniques to develop prediction equations. It was their conclusion that (1) no one variable (ACT subtest) accounts for or predicts success in any one course; and (2) the ability required for success is not always obvious from subtest results. Their elaboration upon the latter conclusion noted that English test scores of their subjects carried more relation to calculus course "success" than did the mathematics test and that the social studies test carried nearly as much weight as the English test in predicting success in English courses. Finally, ACT mathematics and social science tests seemed to involve abilities related to a wide range of courses since math scores were included in 14 of 18 prediction equations and social studies in 16 of 18.

Research has not yet settled the question of validity of any one or group of measuring devices, identified those which can predict more accurately, or concurred on the universal application of any unique set of equations. Yet this does not deny the fact that students, counselors, faculty, and administrators need all possible academic and personal information which might be available. "The alternatives. . .appear less tenable," notes Hoyt (1968) of the American College Testing Service. "If academic information is not available (college participants) use unreliable substitutes; rumor, anecdotes based on one or two students, crude, or incomplete information from. . .commercial guides, etc." The more tenable alternative appears to be development of the best possible measures of predicting achievement, persistence, and success—tested and retested, duplicated and replicated, guided by previous research—until the closest method for adequate prediction at a specific institution is available. In the end, all must realize that academic success is but one measure of accomplishment and distinguished performance, and may bear little relation to the total life style and life accomplishment of any one or group of individuals.

Hendrix (1968) summarized his attempt to determine the nature and extent of relationship between the total college GPA and grades in selected courses and two predictor variables including the ACT scores and high school graduation status. Based upon his application of multiple linear equations he concluded that the most accurate predictions can be obtained by using the four subtest scales as predictors for individual course grades; these appear more accurate than the predictions for overall GPA.

Important and noteworthy results from other research employing the ACT battery in part or entirely is readily available to one who peruses the literature. Additionally, an extensive series of ACT Research Reports published for over a decade includes references to appropriate other uses of the instrument. Significant to the purposes of this study is the knowledge that the ACT Composite score is one measurement base point which enjoys generally widespread acceptance and credence.

Implications from the research literature. Research on college students has taken on new dimensions since the end of the second world war, expanding from studies concerned purely with cognitive potential to studies dealing with the facts and implications of social, environmental, and personality characteristics and their influence upon college effort and achievement.

With the rapid expansion of the community college in the national tripartite of higher education, and the simultaneous massive enrollment of freshmen students, has come the need to meet a wide variety of declared objectives of students who represent an equally wide variety of personal and intellectual potential.

In her oft-quoted paper delivered to the WICHE conference in 1960, Dorothy Knoell underscored specific areas of needed institutional study, analysis and evaluation of students, concluding with this position:

> A third area of investigation by individual colleges . . .is the development of techniques for the early identification of potential withdrawals. . .The problem, then, is one of developing techniques for measuring symptoms of behavior leading to drop-out, before the student makes the irrevocable decision.
>
> Experimental use of inventories of values, beliefs, and attitudes as part of placement testing, to identify students with extreme profiles of scores who may experience difficulty in adjusting to the college environment and/or in changing or maturing (is needed).

One important procedure by which to gain greater insight and understanding of student potential quickly and early in the college stay is to develop a predictive device. It is proposed that by utilizing the Omnibus Personality Inventory as a major vehicle, supplemented by the ACT battery, a statistically dependable method can be developed to distinguish in advance between groups of students and identify especially those who are potential dropout non-persisters.

CHAPTER III

CONTEXT OF THE STUDY

This investigation evolves out of a larger institutional study in which the investigator became involved at Foothill College in Los Altos Hills, California. In 1964, Dr. O. B. Nereson, Foothill College Testing Officer and guidance specialist, proposed to the college president and academic dean the urgency to conduct a study of community college student characteristics. Stressing the need to gain a better understanding of students and proposing an ambitious multiphasic design, Nereson established several criteria for such a study: that it be a longitudinal rather than cross-sectional study; a broad spectrum student sampling group; and that the data gathering involve sufficient quantities and depth of information about students as to allow the flexibility of a variety of descriptive and statistical analyses of data.

With administrative encouragement, the first activity was initiated; this was the design of an information system, descriptive in nature, which would profile students collectively in terms of a multitude of characteristics and variables as outlined in Appendix A-1 of this paper. Having gathered these data, the study would then be organized into three phases which were expressed in terms of research questions:

Phase I. What are the persistence patterns of our freshmen in terms of their formal education? To what degree do they persist in their educational program?

Phase II. What are the academic performance patterns of our freshmen as they proceed with their education? Is it the same as found in the traditional college?

Phase III. What are the characteristics that seem to differentiate between various student populations? What are the differences between populations in terms of ACT and OPI measurement scores?

The most compelling reason for engaging this research was to study and analyze the non-intellective characteristics of the students, to demonstrate the degree and dimension of difference between the students on these measures, and to identify through such an analysis those characteristics which could be included in a predictive model to identify in advance potential successful and unsuccessful college students. Such a prediction model would then be utilized by student personnel and counseling faculty as a critical first stage in long-term academic, career and personal counseling of students. Further, having once defined a workable system for analyzing large-n clusters of students, the potential for application to several individual academic disciplines would be a logical extension. That Phase III of the institutional study, then, became the central focus of this research.

The Institutional Environment. The Foothill College District began instruction on a temporary campus on September 15, 1958 and moved to its permanent site to offer instruction in September, 1961. The entering student population of Foothill College in 1965 came largely from the District's 105 square mile area. Serving an urban section in the northern part of Santa Clara County approximately forty miles south of San Francisco, the 121 acre campus accommodated students from Palo Alto, Mountain View, Sunnyvale, Cupertino, Los Altos Hills, Monta Vista, and parts of Saratoga. The college served three high school districts: Palo Alto Unified School District, Mountain View-Los Altos High School District, and Fremont Union High School District. In addition to ten public and three private or parochial high schools within the district, an additional five public high schools were in the nearby "free attendance" areas, giving a total of eighteen high schools which sent students to Foothill College.

While the area served by Foothill College was primarily residential, Palo Also, Mountain View, and Sunnyvale each had substantial industrial and commercial development and the entire area was spotted with numerous retail trading centers. Growth in population since 1940 had been great; in 1940 it was estimated at 46,000; in 1950 at 74,000; in 1960 at 225,000; and in 1965 at over 300,000. The Distirct's approximate assessed valuation was $458 million in 1960-61 and exceeded $700 million in 1965, placing it high among the financially advantageous junior colleges in California at that time.

Educational Setting. Dr. Nereson (1971) described the academic scene into which the entering class of 1965 merged:

> When these freshmen arrived at Foothill, there were nearly 7,000 students. . . .Many new instructors were also orienting themselves; the campus was crowded; there was a dress code. . .there were many students

> from out of state as well as from foreign countries; student demonstrations were. . .something that happened at Berkeley; "Turn-off" and "T-Groups" were new concepts; hairdos were still (conventional); student activities such as football were still relatively popular; the drug scene was still pretty much around the corner; De Anza (a second campus) was still in the future; curricular innovations were just emerging.
>
> On the national scene, the public had just inaugurated a very popular president who would soon have us out of war. Although there was disturbing news about the draft quotas, there was hope that the general situation would improve. Violence, smashing windows at Stanford, were still way out ideas.
>
> . . .there was still a feeling of "normalcy." Few of these students, or their faculty anticipated the political, social, or educational disturbances and violences that would take place within the five-year period which (would follow).

The Entering Class of 1965. The fall semester 1962 enrollment for day classes was 3,184 while in the fall semester 1965 the college enrolled 6,405 students, representing a 101 percent enrollment increase in three years. That 1965 day enrollment included 2,537 who were apparent bona-fide first-time entering freshmen students having never attended any college classes, representing 40 percent of the total day college enrollment.

Table II-1

New and Returning Students: Day, 1965

	First Time Students	New-Transfer-In Students	Returning & Continuing Students	Total
Number	2537	605	3263	6405
Percent	39.6	9.4	50.9	99.9%

Source: Office of the Registrar, "October Report" statistics.

Of all day students enrolled, 89 percent were district residents; 9 percent had resided out of district and 2 percent out of state.

Table II-2

District Residence: Day Students

	In-District	Out-of-District	Out-of-State	Total
Number	5690	555	160	6405
Percent	88.8	8.7	2.5	100%

Source: Office of the Registrar, "October Report" statistics.

Of all day students 74 percent were under 21 years of age and another 19 percent represented ages 21-29; the modal age was 18. Entering freshmen women represented 40 percent and the men 60 percent of the class; 82 percent of the freshmen women and 90 percent of the men were single.

Table II-3

Age and Sex of Students: Day Students

	Male		Female		Total	
Age	No.	%	No.	%	No.	%
61+	0	-	3	-	3	0.05
30-60	95	2.5	311	12.1	406	6.3
21-29	952	24.8	301	11.8	1253	19.6
20	506	13.2	199	7.8	705	11.0
19	778	20.2	479	18.7	1257	19.6
18	1188	30.9	949	37.1	2137	33.4
17	323	8.4	312	12.2	635	9.9
16	1	-	5	0.2	6	0.1
15	2	-	1	-	3	0.05
Totals	3845	100%	2560	99.9%	6405	100%

Percentage of Male Students - 60%
Percentage of Female Students - 40%

Source: Office of the Registrar, "October Report" statistics.

Seventy-two percent of the students declared themselves to be transfer students and 28 percent as "career" students; only three individuals reported themselves "undecided." Only one percent of all day students (34 males and 22 females) expected to receive Veterans Administration or Veterans' Children's education and training allowances while enrolled.

No information about ethnic, religious, or economic status of students was gathered by any department or service of this college prior to or during the enrollment period of the students who entered the college in the fall of 1965. Indeed, at this time in national higher education there was much sensitivity about requesting such information: requests for "mug shot"-type photographs were discouraged and voluntary student responses to requests for such information were met with little student participation.

Nature and Characteristics of the Study Group

This investigation is concerned with analyzing and studying nearly 1,400 students who entered Foothill Community College as first-time day students enrolled in more than a 50 percent academic load. While all subsequent narrative, analysis, and discussion will concentrate on the objectives and concerns of studying that group of students, it is important that occasional early comparisons be made with a sample of 2,308 freshman-level students studied by Nereson in Phase I and II, and described above and labeled hereafter as the "Comparison Group." Such comparisons will be valuable in aligning this study's subjects with the total group of 2,308 of which they were a part, so as to examine their similarities and confirm that there was no particular uniqueness about the 1,400 student study group. The same is held to be true for comparisons of this study group with the entire entering class of 2,537 for whom ACT data are reported. [Appendix B-1 Lists Input Data.]

All freshmen entering Foothill College in 1965 who enrolled in nine or more units were also enrolled into an orientation course. Six groups of students who were admitted through special selection and admission procedures in Allied Health career programs, and two groups of students in two other career fields attended specialized orientation classes; all other first-time, "full-time" freshmen attended Psychology 50, Introduction to College classes. The course description in the 1965-66 Foothill College Catalog follows:

> Psychology 50 Introduction to College 1 Unit
>
> Prerequisites: None
>
> Required of all beginning freshmen carrying more than eight units unless enrolled in an equivalent course in the Biological Sciences or Engineering.*
> Group and individual counseling sessions in which counselors help counselees (1) develop effective study habits and skills; (2) gain an understanding of themselves, especially their attitudes and interests; (3) explore and select an occupational area; (4) plan their educational program; (5) become aware of their responsibilities and opportunities as college students.

---

*Dental Assisting, Dental Hygiene, Engineering, Home Economics, Inhalation Therapy, Medical Assisting, Nursing, X-Ray Technology.

The students included in this study number nearly 1,400 of the total 2,308 in the comparison group. They represent students enrolled in more than a 50 percent academic "load," students not included in highly select career programs described above, students who are bona-fide first-time freshmen, and students for whom complete information is available in terms of "scores" on ACT and OPI instruments and whose academic record for five years was available for examination. Despite these distinctions the study group as a whole appears not to be dramatically different--on the surface--from the larger comparison group nor from the entering classes of freshmen for the four subsequent years.

ACT Scores. An examination of the data presented in Table II-4 shows the mean scores and standard deviations for the study group and for the incoming classes of 1965 through 1969 to be very similar for English, Mathematics, Social Studies, Natural Science, and the Composite areas. Certainly, any distinction between the study group and the class from which it came is difficult to draw. While the 1965 total group and study group are consistently higher in every area than any subsequent class, they are not significantly higher. Only in mathematics does there appear any significant difference (slightly more than one standard score higher) in relation to classes of 1967 and 1968. Despite the fact that all "entering" classes 1965 through 1969 included students who have had previous college experience, the first-time study group does not "look" significantly different on the ACT individual and composite scores.

Looking again at ACT scores in Table II-5, the data show the comparisons between the study group and the entire class of 1965 with three normative samples: (a) college bound seniors tested from 1962-65; (b) those students who entered a two-year associate degree-granting college, and (c) those who entered into a four-year

TABLE II-4

MEAN SCORES AND STANDARD DEVIATIONS OF ACT SUBJECT MATTER AREAS AND COMPOSITE FOR STUDENTS ENTERING FOOTHILL COLLEGE 1965-1969 AREAS & COMPOSITE FOR STUDY GROUP FROM ENTERING CLASS FALL, 1965

Year	English	Mathematics	Social Science	Natural Science	Composite
Study Group	17.8	18.5	20.4	20.1	19.4
	5.2	6.6	6.0	6.6	5.0
1965 Mean	18.0	18.1	20.8	20.2	19.4
S.D.	4.9	6.1	6.0	6.1	4.8
1966 Mean	17.8	17.5	20.4	19.6	19.0
S.D.	5.1	6.3	6.3	6.1	5.0
1967 Mean	18.1	17.3	20.2	19.9	19.0
S.D.	5.1	6.2	6.4	6.2	4.9
1968 Mean	17.5	17.2	19.5	19.9	18.6
S.D.	5.0	6.7	6.3	6.3	5.0
1969 Mean	17.9	17.9	20.2	20.3	19.2
S.D.	5.3	7.1	6.5	6.5	5.2

Source: ACT Class Profile Reports for Foothill College, ACT Program, Inc.

baccalaureate degree-granting college or university. The approximate median composite score for college bound seniors was 20, for two-year entrants 18, and for four-year entrants 20; both the study group and the total 1965 class fall between the two, more than one standard score above two-year entrants and only slightly below four-year entrants. Scores on three of four subtests, excluding English, suggest the study group more nearly resembles the normative sample of four-year entrants.

TABLE II-5

MEAN SCORES AND STANDARD DEVIATIONS OF ACT SUBJECT MATTER AREAS AND COMPOSITE FOR STUDENTS ENTERING FOOTHILL COLLEGE FALL, 1965, FOR STUDY GROUP FROM ENTERING CLASS FALL, 1965, AND FOR THREE NORMATIVE SAMPLE GROUPS

Year	English	Mathematics	Social Science	Natural Science	Composite
Study Group	17.8	18.5	20.4	20.1	19.4
	5.2	6.6	6.0	6.6	5.0
1965 Mean	18.0	18.1	20.8	20.2	19.4
S.D.	4.9	6.1	6.0	6.1	4.8
Table 2^{z}	19.5	19.6	21.1	21.0	20.4
S.D.	N/A	N/A	N/A	N/A	N/A
Table 3*	17.2	17.4	18.4	18.7	18.1
S.D.	5.1	6.0	6.1	6.1	4.8
Table 4#	18.8	19.2	20.1	20.1	19.7
S.D.	4.9	6.1	5.9	6.0	4.8

Notes: N/A = Not provided in research survey

Table 2^{z} = ACT tested student normative data, 1,290,812 college bound high school seniors tested between November 1, 1962 and October 30, 1965.[1]

Table 3* = ACT tested student normative data for freshmen who entered Level I (two year) colleges, based upon 39,774 students tested in 1963, 1964, or 1965.[2]

Table 4# = ACT tested student normative data for freshmen who entered Level II (four-year baccalaureate awarding) colleges,[3] based upon 39,985 students at 125 colleges.

[1,2,3] *Using ACT in Secondary Schools: A Handbook for Counselors*, (Iowa City, Iowa: The American College Testing Program, Inc., 1966), p. 8.

TABLE II-6

PERCENTAGE OF STUDENTS IN VARIOUS HIGH SCHOOL G.P.A. CATEGORIES FOR 1965 - 1969

High School Grade Categories	Percent				
	1965	1966	1967	1968	1969
3.5 - 4.0	5.5	5	6	5	7
2.5 - 3.4	39.4	37	42	42	45
	91%	90%	91%	90%	89%
1.5 - 2.4	51.6	53	49	48	44
0.5 - 1.4	4.0	5	4	6	4
0.0 - 0.4	0	0	0	0	0

Source: Annual ACT Class Profile Reports, American College Testing Program, 1965 through 1969.

High School Grades and Educational Goals. High school grade averages and the educational plans of the study group *per se* were not available. It is of value, however, to illustrate that the entire entering class of 1965 is strikingly similar to subsequent classes in both instances.

Table II-6 reveals high school averages for entering students to be different only in the nature of change over the five years. The percentages of students receiving GPA's of "B" rather than "C" increased from 1966 to 1969; however, the combination of students receiving "A" and "C" grades during the five years remained almost constant at 91, 90, 91, 90, and 89 percent respectively. The entering class of 1965 appears not to be unique.

TABLE II-7

EDUCATIONAL PLANS, DEGREES SOUGHT, AS INDICATED BY STUDENTS ENTERING FOOTHILL COLLEGE--1965 - 1969

Educational Goal and Level	Percent				
	1965	1966	1967	1968	1969
High School Diploma or less than 2 years	0.2	0.4	2.0	1.0	2.0
A. A. Degree or less than Bachelors Degree	21.3	28.4	20.0	22.0	16.0
Bachelors Degree	39.8	36.9	39.0	39.0	37.0
M.A., M.B.A., one or two years of graduate or professional study	24.8	21.3	26.0	25.0	30.0
Doctors (Ph.D.) Degree	4.4	3.6	5.0	4.0	6.0
M.D. or D.D.S.	2.6	2.4	2.0	3.0	3.0
Doctor of Law (L.L.D.)	2.1	2.1	1.0	1.0	2.0
Bachelor of Divinity	0.2	0.2	0.0	0.0	0.0
Other	4.6	4.6	4.0	4.0	4.0

Source: Annual ACT Class Profile Reports, American College Testing Program, 1965 through 1969.

Appraising Table II-7 one must conclude that the class of 1965 exhibits no educational aspiration level unique from four subsequent entering groups. Combining expectation levels for all students who aspired to a baccalaureate degree or higher, the five classes leveled at 74, 67, 73, 72, and 78 percent. Any significant difference appears to be (a) in the class of 1966 increase in percentage of students not planning to seek beyond an associate degree level and (b) the 1969 class decrease in associate degree seekers in favor of higher levels.

First Semester Academic Load: Study vs Comparison Groups. Another useful way of describing similarities of the study group and the larger comparison group is to note first semester academic study load. For the fall of 1965, the first semester of college for these students, permanent records show that 184 students (8 percent) of the comparison group attempted no units while only one of the study group attempted no units. It is most probable that these students, although initially enrolled in classes, withdrew prior to the official drop date. Further examination of Table II-8 reveals that while 12 percent of the comparison group did not complete any units the first term, only .9 percent of the study group failed to complete any units. While 13 percent of the total group enrolled in only 1 to 8.5 units, 18 percent of the group completed only 1 to 8.5 units, a change of +5 percent; the study group had 6 percent of its number who enrolled in fewer than 9 units,* but 13.3 percent of the study group completed less than a half load. Despite these small differences in first-term enrollment persistence, an inspection of the overall "loss/gain factor" or the percentage of change from units attempted and units completed reveals the two groups to be considerably alike; again, not a surprising observation inasmuch as the study group comprises 60 percent of the total comparison group.

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*Earlier it was stated that the study group was composed of students enrolled in eight or more units. While this was true during the opening week of classes, some 811 students were officially enrolled in only .5 to 8.5 at the first census period.

TABLE II-8

DISTRIBUTION OF UNITS ATTEMPTED AND UNITS COMPLETED BY CATEGORIES
FALL 1965

Units	Comparison Group				Study Group				Loss/Gain Factor Percent	
	Attempted #	%	Completed #	%	Attempted #	%	Completed #	%	Class	Study
15-23	676	29	554	24	527	37.8	446	32.0	-5.0	-5.8
12-14.5	787	34	661	28	571	41.0	496	35.6	-6.0	-4.4
9-11.5	354	15	385	18	212	15.2	254	18.2	+3.0	+3.0
6- 8.5	160	7	234	10	60	4.3	123	8.8	+3.0	+4.5
1- 5.5	147	6	192	8	23	1.7	63	4.5	+2.0	+2.8
0- .5	184	8	282	12	1		12	.9	+4.0	+ .9
Total	2308				1394					

Distribution of first semester grades. Another comparison between the two groups to establish their relative similarity can be made on the basis of first term grade point average. Table II-9 inspection leads one to observe a modified normal curve, especially if the students who earned or completed no units were eliminated.

Note first the comparison group. In their first semester 9.9 percent earned a "B" or better average, 45.5 percent "C" or better, 35.9 percent fell into the "D" range and 7.7 percent failed. The study group percentages in the same categories were 10, 1, 47.5, 36.5, and 5.0 percent; three percent more B's and C's to account for fewer failing grades than the larger group. On balance, however, little measurable difference distinguishes between the study and comparison groups at the time entry into the college when considering only those students who achieved any GPA.

TABLE II-9

DISTRIBUTION OF GRADE POINT AVERAGES
FOR 2308 VS 1394 FRESHMEN—FALL SEMESTER, 1965

Grade Point Averages	Comparison Group Fall, 1965, Semester #	%[a]	%[b]	Study Group Fall, 1965, Semester #	%
4.0	14	.6	.8	2	.1
3.5-3.99	40	1.7	1.8	29	2.1
3.0-3.49	165	7.2	8.1	111	8.0
2.5-2.99	315	13.6	15.6	236	16.9
2.0-2.49	604	26.2	29.9	427	30.6
1.5-1.99	441	19.1	21.7	329	23.6
1.0-1.49	286	12.4	14.2	180	12.9
.5- .99	111	4.8	5.4	51	3.7
.1- .49	48	2.1	2.3	18	1.3
.00	284	12.3		11	.8
Total	2308	100%		1394	100%

%[a] = Percent of all students in group including 282 who completed 0 units and thus received .00 GPA.

%[b] = Percent of all students in group who received a grade.

Summary

This chapter has described nearly 1400 "new" college students enrolled, taking a variety of transfer and career programs and registering for eight or more units of course work. Based upon their "scores" and achievement as measured by high school performance, American College Testing Program instruments, academic aspirations declared, and college initial-semester enrollment and achievement, the sample group was shown to be not uniquely different or extreme from their class of 2500, from freshmen class entrants into Foothill College in four subsequent years, or—on certain factors—from other students nationally who entered two-year or four-year colleges and universities from 1962 through 1965.

It is valid to treat the sample group as a representative cross-section of men and women who might normally have been expected to enroll in any given community college in 1965; nothing is observable in the nature and character of this group which might distort the statistical measurement and analysis in later chapters.

CHAPTER IV

ACADEMIC PERFORMANCE OF STUDY GROUP

Both the quality and quantity of academic achievement are important to analyze in a persistence study. Contemporary measures of student achievement and of the quality of student preparation include grade point average for all academic units completed. Both GPA and units completed are of central importance to this study. This chapter will describe the students investigated and focus on several displays of quantitative and qualitative achievements of the study group.

The Study Group

Chapter Three described significant characteristics of this study's first-time freshman male and female day students enrolled in the fall semester of 1965. Of approximately 1800 students who completed the OPI and ACT instruments as a matriculation function, some 1450 were first-time freshmen; complete academic records for all semesters and quarters attended for a five-year period in the same college were available and examined for 1393 of these students.

Of the study subjects 517 completed the equivalent of an Associate in Arts degree (i.e. 60 or more units with a GPA of 2.0 or above on a 4.0 system) including those who actually received degrees. This group of students, plus those still enrolled in the spring of the fifth year (n=31) comprise the persisters in this study, (Table IV-1).

The remaining 876 students include 401 who withdrew in "good standing" prior to completing 60 units of study and 475 who were disqualified or voluntarily withdrew in probationary standing (below 2.0 GPA) before completing 60 units of study. These students comprise respective categories labeled successful non-persisters and unsuccessful non-persisters.

TABLE IV-1

ACADEMIC STATUS OF 1393 FIRST-TIME FRESHMEN OVER FIVE-YEAR PERIOD FROM 1965 - 1970

	Status		Number		Percent
I	Persisters				
	(60 or more units with) (2.0 or better GPA)	(486)		(34.89	
	(Still enrolled)	(31)	517	(2.22)	37.11
II	Successful Non-persisters (Fewer than 60 units &) (GPA of 2.0 or better)		401		28.79
III	Unsuccessful Non-persisters (Fewer than 60 units &) (GPA below 2.0)		475		34.10
	Totals		1393		100.00

Obtaining student information and recording the initial data. A number of operational steps were undertaken to gather the initial information essential to the studies of interest to both Foothill College and this investigator. Those activities appropriate to this study can be clustered into four categories:

1. Certain background information about students collected through the Registrar's office at Foothill College has been noted in several tables in this report. Other information was gathered from student permanent records.
2. The incoming freshman academic ability information, educational expectations and (limited) demographic data were obtained from the ACT test responses which students completed before registration into the college and which were reported on the "ACT Class Profile Report, Freshman Class--1965" by the American College Testing Program, Iowa City.
3. The five-year academic performance of students was obtained from permanent records at the college, all by manual recording and tabulation.
4. The use of the Omnibus Personality Inventory was discussed by college officials with Dr. Paul Heist of the University of California and permission was extended to use the research form. The inventory, Form D, was administered to 1,450 first-time freshmen.

Units attempted and completed, first term:

During the period of this study college academic policy held that students enrolled in 15-17 units were considered to be carrying a maximum load, that 12 units constituted a full load, and 8 units was a half-load. Table IV-2 (page 63) displays units attempted and completed the first semester by each of the three subgroups and the total study group. Several observations should be noted.

1. Of the entire group of nearly 1400 students enrolled the first term, eleven percent fell during that same semester from full-time load to half-time or less-than-half-time; two-thirds of those who dropped so many units that first term were eventually to become unsuccessful students.

2. Population III (the ultimate unsuccessfuls) experienced a twenty-two percent drop from the full-time and three-quarter time categories; seventeen and a half percent of the drop resulted in increases in the 1-6 and 6-9 categories.

3. Population I (successful persisters) and II (successful withdrawers) experienced a 4.5 and 3.5 percent loss respectively from the maximum load enrollment areas by the end of the first term. For Population II nearly all resulted in increased numbers of students completing 9-12 unit loads; the Population I distribution was lower and almost equally into the 6-9 and 9-12 unit areas.

Summary: During the first term of enrollment, students who were to ultimately become unsuccessful at their college of first enrollment dramatically failed to complete the units attempted. Over one-fifth of those students failed to complete units attempted at the level of full-time status. Of the total group of 156 students who fell from above to below a full-time level (12 units) the unsuccessful group III accounted for 105 or two-thirds; the remainder represented almost equally groups I and II. Unit loads of successful persister students tended to settle downward in the half- to full-time level (6-12 units) while most of the successful non-persisters settled in the near full-time (9-12) unit level. Unsuccessful students dropped significantly into less than half-time levels.

TABLE IV-2

DISTRIBUTION OF UNITS ATTEMPTED AND COMPLETED
FALL, 1965

	Pop 1				Pop 2				Pop 3				Group			
	Attempted		Completed		Attempted		Completed		Attempted		Completed		Attempted		Completed	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
15-19.5	280	54.2	257	49.7	128	31.9	114	28.4	119	25.1	75	15.8	527	37.8	446	32.0
12-14.5	190	36.7	186	35.9	188	46.9	178	44.4	193	40.6	132	27.8	571	41.0	496	35.6
9-11.5	39	7.5	51	9.9	54	13.5	73	18.2	119	25.1	130	27.3	212	15.2	254	18.2
6- 8.5	7	1.4	21	4.1	22	5.5	27	6.7	31	6.5	75	15.8	60	4.3	123	8.8
1- 5.5	1	.2	2	.4	9	2.2	9	2.2	12	2.5	51	10.7	22	1.6	62	4.5
0- .5	0		0		0		0		1	.2	12	2.5	1	1	12	.9
	517	100	517	100	401	100	401	99.9	475	100	475	100	1393	100	1393	100

Units attempted and completed, five years:

Table IV-3 (page 65) displays the units attempted and completed by each of the study groups and the total group over the five-year period under investigation. For purposes of comparison of the data in Table IV-3, however, Table IV-4 (page 66) displays groupings of units into clusters of one semester (15 units), one year (30 units), less than two years (fewer than 60 units) and two years (60 and above). [Table IV-4 also includes the completion records of the entire freshman class of 1965 which numbered 2308 students.] The following observations of the data in the Table IV-4 are noteworthy.

1. Thirteen percent of the study group failed to complete the equivalent of one semester's work (15 units) in five years, ten percent of whom were within the unsuccessful group and three percent in the successful withdrawals. Two students still enrolled in Population I had completed fewer than 15 units in five years.

2. Twenty percent of the group completed between 15-30 units; in this category, thirteen percent of them came from Population III, six percent from Population II and only four students who were still enrolled.

3. Of the study group, 460 or one-third, failed to successfully complete a full year of work; twenty-four percent were eventually unsuccessful and nine percent were to withdraw in good standing.

4. Four hundred forty-two students, nearly one-third, completed more than one year of academic studies but not the equivalent of two years. Of those completers, thirty-three percent were eventually unsuccessful, sixty-two percent were to withdraw in good standing, and five percent were still enrolled five years later.

TABLE IV-3

DISTRIBUTION OF UNITS ATTEMPTED AND COMPLETED FIVE YEARS CUMULATIVE

	Pop I				Pop II				Pop III				Group			
	Attempted		Completed		Attempted		Completed		Attempted		Completed		Attempted		Completed	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
90-99.5	15	3.	9	2.									15	1.	9	1.
80-89.5	43	8.	36	7.									43	3.	36	3.
70-79.5	101	20.	89	17.									101	7.	89	6.
60-69.5	333	65.	357	69.	30	8.			11	2.			374	27.	357	26.
50-59.5	7	1.	7	1.	103	26.	128	32.	39	8.	20	4.	149	11.	155	11.
40-49.5	6	1.	5	1.	66	16.	62	15.	50	11.	51	10.	122	9.	118	8.
30-39.5	6	1.	8	2.	80	20.	85	21.	83	17.	76	16.	169	12.	169	12.
20-29.5	4	1.	4	1.	61	15	64	16.	135	28.	118	25.	200	14.	187	13.
15-19.5	0		0		20	5.	21	5.	55	12.	69	15.	75	5.	90	6.
10-14.5	1		1		29	7.	30	7.	70	15.	55	12.	100	7.	85	6.
5- 9.5	1		1		12	3.	11	3.	31	7.	77	16.	44	3.	89	6.
0	0		0		0		0		1		9	2.	1		9	1.
	517	100.	517	100.	401	100.	401	99.	475	100.	475	100.	1393	99.	1393	99.

TABLE IV-4

DISTRIBUTION OF UNITS ATTEMPTED AND UNITS COMPLETED BY CATEGORIES
FIVE YEARS CUMULATIVE

Units	Comparison Group				Entire Study Group				Loss/Gain Factor Percent	
	Attempted		Completed		Attempted		Completed		Class	Study Gp.
	#	%	#	%	#	%	#	%	n=2308	n=1393
	n=2308				n=1393					
60-up	689	29	634	27	533	38	492	35	-2.0	-3.0
30-59.5	626	27	618	27	440	32	442	32	0	0
15-29.5	457	20	437	19	275	20	277	20	-1.0	
.5-14.5	409	18	409	18	144	10	174	12	0	+2.0
0	127	6	210	9	1		9	1	+3.0	+1.0
			2308	100			1393	100		
	Comparison Group				Pop I				Class	Pop I
60-up	689	29	634	27	492	95	491	95	-2.0	0
30-59.5	626	27	618	27	19	4	20	4	0	0
15-29.5	457	20	437	19	4	.5	4	1	-1.0	0
.5-14.5	409	18	409	18	2	--	2	--	0	0
0	127	6	210	9					+3.0	
							517	99		
	Comparison Group				Pop II				Class	Pop II
60-up	689	29	634	27	30	8	0	0	-2.0	-8.0
30-59.5	626	27	618	27	249	62	275	69	0	+7.0
15-29.5	457	20	437	19	81	20	85	21	-1.0	+1.0
.5-14.5	409	18	409	18	41	10	41	10	0	0
0	127	6	210	9					+3.0	
							401	100		
	Comparison Group				Pop III				Class	Pop III
60-up	689	29	634	27	11	2	0	0	-2.0	-2.0
30-59.5	626	27	618	27	172	36	147	31	0	-5.0
15-29.5	457	20	437	19	190	40	187	39	-1.0	-1.0
.5-14.5	409	18	409	18	101	22	132	28	0	+6.0
0	127	6	210	9	1		9	2	+3.0	+2.0
							475	100		

5. Four hundred ninety-two students, thirty-five of the sample, successfully completed 60 semester units of study or more, the minimum unit requirement to receive an Associate in Arts degree at the college and the minimum number of units to be eligible for upper division standing upon transfer to a California state college or university campus.

6. Only thirty students from Population II and eleven students from Population III attempted 60 or more units, none of whom completed as many. By contrast, only one of the 493 Population I students who attempted 60 or more units failed to complete as many in the five-year period, a significant persistence record for that group.

7. The right hand pair of columns in Table IV-4 analyzed "slippage" for the study group, its sub-groups, and the entire class of 2300 students. As was true in the first term, the slippage of Population II for the five-year period was markedly less pronounced than was true for the unsuccessful Population III. Despite the extremes in slippage for sub-groups II and III, the total study group—when compared with the entire class—looks very little different.

Summary: The study group's record of units completed divided almost equally into thirds: One-third failed to complete one year successfully, another near-third completed one year but less than two years, and the final third completed at least the equivalent of two years. Population I students, the successful completers, achieved a strikingly high unit-completion record in a five-year period of study. This is true both within categories representing multiples of ten units above the 60 units AA degree minimums as displayed in Table IV-3 and in common segments of one-semester, one-year, and two-year. Variations for Population II which appear to be slight by Table IV-3 tabulations of ten-unit clusters become more disparate in terms of semester benchmarks in Table IV-4. Finally, one concludes that the performance of the entire study group, either in comparison with the total class or when standing alone, is measurably "stable" due principally to the unit achievements of the successful completers and the dimension of shift by the successful non-persisters.

Distribution of Grades

1. The Study Group. An inspection of the data in Tables IV-5 and IV-6 (pages 70 and 71) "Distribution of Grade Point Averages," reveals a modified normal curve for both the first term and the five-year performance of all 1400 students. There is little change from the first term to the five-year performance in the percentages of students in the several grade point average categories. Comparing the percentages of students in each grade category for the first term and five years respectively, it may be observed that ten percent and nine percent received "B" or better marks; approximately forty-eight percent and fifty-four percent "C" grades; thirty-seven percent and thirty-three percent "D" marks; and that slightly less than six percent and more than four percent of all students failed. In five years, the direction of change was more noticeably up from "F" and "D" ranges to average grade achievement for the entire group.

2. The Successful Students, Population I and II. As with an appraisal of units attempted and completed in five years, there is some value in analyzing fluctuations in GPA for the several groups. These two populations of subjects, successful completers and successful withdrawers, exhibited almost identical patterns of grade point change during their five years. In each group, 15.5 percent achieved "B" or better grades for the first term and—in five years—only changed by -2 percent and -3 percent respectively. While fifty-nine percent and sixty-nine percent of Population I and II achieved "C" averages the first term, both increased by nearly twenty percent to seventy-nine percent and ninety-eight percent in five years. None of the fifteen percent of Population II who received grades below "C" the first term was in that category when they withdrew; of twenty-five percent of Population I who started poorly and below average, less than one-third (under eight percent) were still below average after five years, and most of those were still enrolled.

3. The Unsuccessful Population III. These students began and finished badly. Only seventeen percent of their group achieved the "C" GPA the first term and none higher than "C"; all of those slipped into the "D" category before withdrawing. There was an improvement in the performance of the failing students in that after five years there were three percent fewer (15.8 percent vs 12.6 percent) in that grade range.

Summary: A striking observation of grade point achievement by three populations of this study is the consistent similarity between the two successful groups, an observation which "gives

TABLE IV-5

DISTRIBUTION OF GRADE POINT AVERAGES
Fall 1965

Grade Point Averages	Pop I Fall 1965 #	Pop I Fall 1965 %	%[z] of ΣG	Pop II Fall 1965 #	Pop II Fall 1965 %	%[z] of ΣG	Pop III Fall 1965 #	Pop III Fall 1965 %	%[z] of ΣG	Group Fall 1965 #	Group Fall 1965 %
4.0	1	.2	.1	1	.2	.1				2	.1
3.5 - 3.99	16	3.1	1.1	13	3.2	.9				29	2.1
3.0 - 3.49	63	12.2	4.5	48	12.0	3.4				111	8.0
2.5 - 2.99	126	24.4	9.1	104	26.0	7.5	6	1.3	.4	236	16.9
2.0 - 2.49	180	34.8	12.9	172	43.0	12.3	75	15.8	5.4	427	30.7
1.5 - 1.99	92	17.8	6.6	51	12.7	3.7	186	39.1	13.4	329	23.6
1.0 - 1.49	36	6.9	2.6	11	2.7	.8	133	28.0	9.5	180	12.9
.5 - .99	3	.6	.2	1	.2	.1	47	9.9	3.4	51	3.7
.1 - .49							17	3.6	1.2	17	1.2
.00							11	2.3	.8	11	.8
	517	100	37.1	401	100	28.8	475	100	34.1	1393	100
(1) Honors*	80	15.5	5.7	62	15.5	4.5				142	10.2
(2) Good Standing	306	59.2	22.0	276	68.8	19.8	81	17.1	5.8	663	47.6
(3) Probation	128	24.7	9.2	62	15.5	4.5	319	67.2	22.9	509	36.6
(4) Disqualified	3	.6	.2	1	.2		75	15.8	5.4	79	5.6

[z] = (% of ΣG) = percentage of total group of 1393 students

* Honors = 3.0 - 4.0
Good Standing = 2.0 - 2.9
Probation = 1.0 - 1.9
Disqualified = below 1.0

TABLE IV-6

DISTRIBUTION OF GRADE POINT AVERAGES
Cumulative 5 Years

Grade Point Averages	Pop I 5-Year		$\%^z$ of ΣG	Pop II 5-Year		$\%^z$ of ΣG	Pop III 5-Year		$\%^z$ of ΣG	Group 5-Year	
	#	%		#	%		#	%		#	%
4.0											
3.5 - 3.99	13	2.5	.9	8	2.0	.6				21	1.5
3.0 - 3.49	58	11.2	4.2	42	10.5	3.0				100	7.2
2.5 - 2.99	166	32.1	11.9	114	28.4	8.2				280	20.1
2.0 - 2.49	241	46.6	17.3	237	59.1	17.0				478	34.3
1.5 - 1.99	35	6.8	2.5				258	54.3	18.5	293	21.0
1.0 - 1.49	4	.8	.3				157	33.1	11.3	161	11.6
.5 - .99							38	8.0	2.7	38	2.7
.1 - .49							13	2.7	.9	13	.9
.00							9	1.9	.7	9	.7
	517	100	37.1	401	100	28.8	475	100	34.1	1393	100
(1) Honors	71	13.7	5.1	50	12.5	3.6				121	8.7
(2) Good Standing	407	78.7	29.2	351	87.5	25.2				758	54.4
(3) Probation	39*	7.5	2.8				415	87.4	29.8	454	32.6
(4) Disqualified							60	12.6	4.3	60	4.3

^{z} = (% of ΣG) = percentage of total group of 1393 students

* = Most still enrolled; however, 8 who received A.A. degree did so with GPA of 1.99 and 1.98

the lie" to some common and often unfounded conclusions about college "dropouts." Within the samples of this study, those students who withdrew successfully before completing the equivalent of an Associate in Arts degree at their first college earned grades commonly acceptable for degree-seeking students and measurably higher than those students in this sample who did complete degree requirements or the equivalent.

Viewing the three groups in terms of academic slippage from the first term to the end of a five-year period (Tables IV-5, IV-6, and IV-7, disqualified through honors categories) it appears a valid conclusion that students who begin poorly hazard completing at a poor achievement level. Focusing upon the unsuccessful Population III, data displayed reveals that sixty-three percent of all students on probationary status the first term were part of the eventual unsuccessful group (despite a college policy which permitted reentry after one quarter away from the campus) and that two-thirds of all students in the two (probation and disqualified) categories were Population III. By contrast, during their first term on campus Population III included no students receiving grades of "B" or above and only twelve percent of all the students receiving "C" grades. Immediate implications for counseling programs become apparent and will be addressed in a later section.

Academic Probation

The college catalogs for the academic years included in the study carried the following statements: "A student will be placed on probation status if at the end of any semester his cumulative average for all college work is below "C". Normally he will be

TABLE IV-7

DISTRIBUTION OF GRADE POINT AVERAGES
FIRST TERM AND CUMULATIVE 5 YEARS

Point Averages	Pop I Fall 1965 #	Pop I Fall 1965 %	Pop I 5-Year #	Pop I 5-Year %	Pop II Fall 1965 #	Pop II Fall 1965 %	Pop II 5-Year #	Pop II 5-Year %	Pop III Fall 1965 #	Pop III Fall 1965 %	Pop III 5-Year #	Pop III 5-Year %	Group Fall 1965 #	Group Fall 1965 %	Group 5-Year #	Group 5-Year %
4.0	1	.2			1	.2							2	.1		
3.5 - 3.99	16	3.1	13	2.5	13	3.2	8	2.0					29	2.1	21	1.5
3.0 - 3.49	63	12.2	58	11.2	48	12.0	42	10.5					111	8.0	100	7.2
2.5 - 2.99	126	24.4	166	32.1	104	26.0	114	28.4	6	1.3			236	16.9	280	20.1
2.0 - 2.49	180	34.8	241	46.6	172	43.0	237	59.1	75	15.8			427	30.7	478	34.3
1.5 - 1.99	92	17.8	35	6.8	51	12.7			186	39.1	258	54.3	329	23.6	293	21.0
1.0 - 1.49	36	6.9	4	.8	11	2.7			133	28.0	157	33.1	180	12.9	161	11.6
.5 - .99	3	.6			1	.2			47	9.9	38	8.0	51	3.7	38	2.7
.1 - .49									17	3.6	13	2.7	17	1.2	13	.9
.00									11	2.3	9	1.9	11	.8	9	.7
	517	100	517	100	401	100	401	100	475	100	475	100	1393	100	1393	100

allowed to remain in school on probation and not be disqualified unless his cumulative grade points are more than ten below the number required for a "C" average."

Table IV-8 displays by population, both the study group and the comparison group, the probation statistics of five years.

TABLE IV-8

TERMS ON PROBATION OR DISQUALIFIED BY PROBATION

Terms on Probation	Pop I #	Pop I %	Pop II #	Pop II %	Pop III #	Pop III %	Study Group #	Study Group %	Comparison Group #	Comparison Group %
None	350	68.0	310	77.5	-	-	660	47.0	1143	49.5
1	41	8.0	49	12.0	172	36.0	262	19.0	420	18.0
2	28	5.4	22	5.5	146	31.0	196	14.0	326	14.0
3	29	5.6	14	3.5	89	19.0	132	9.5	199	8.5
4	29	5.6	2	.5	45	9.0	76	5.5	115	5.0
5	16	3.1	3	.8	13	3.0	32	2.0	44	2.0
6	8	1.5	1	.2	5	1.0	14	1.0	24	1.0
7	11	2.1			5	1.0	16	1.0	21	1.0
8	3	.6 13%		1.5%		14%	3		9	
9 or more	2						2		7	
	517	99.9	401	100	475	100	1393	99	2308	99

Term of Disqual.	#	%	#	%	#	%	#	%	#	%
None	493	95.2	399	99.5	308	64.8	1200	86.0	1974	85.5
1	19	3.7	2	.5	145	30.5	166	12.0	292	12.7
2	4	.8	-	-	19	4.0	23	1.7	37	1.6
3	1	.3	-	-	3	.6	4	.3	5	.2
	517	100	401	100	475	99.9	1393	100	2308	100

These observations from Table IV-8 are appropriate:

1. Of the comparison group of 2300 plus students, half were never on probation, nearly one-fifth were on only one time, fifteen percent two times, and fewer than ten percent a third time; the remaining ten percent of the class were on probation from four to nine times.

2. The sums of percentages in each of these same categories which comprised the study group totals were almost identical.

3. The subgroup with the largest percentage (77.5) of students never to be on probation was the successful non-persister (Population II) group; the successful persisters fell ten percent lower in the same category. Because the successful non-persisters left college early and in large numbers, (Table IV-9) that occurrence may account for the fact that only six of the group (1.5 percent) were on probation four or more times; by the end of the fourth and fifth terms, eighty-one and ninety-two percent of all Population II had left the college.

4. Of the unsuccessful students over one-third were on probation once, nearly another third for two terms and almost one-fifth for three terms during their also-brief enrollment. Fourteen percent were on probation four or more times despite the fact this group also withdrew early in large numbers.

5. Perhaps the most striking revelation of the probation table for Population I successful persisters is that although nearly seventy percent were never on probation, nearly fifteen percent were on probation four or more terms of a possible twelve.

terms (three years of two semester terms and two years of three quarter terms). This is the same percentage of students on probation as experienced by the unsuccessful students: [This seems to be supportive of the contention that persistence is a matter of more than academic success as measured solely by GPA statistics.]

Summary: While students who received degrees or completed the equivalent number of units appear to have had a poorer record in remaining off the probationary student listings than those who were academically successful but left this college early, there must be careful interpretation. By the end of the third term, eighteen percent of Population I vs twenty-one percent of the Population II had been on probation; yet Population II had been reduced by forty-six percent of its numbers by the end of term three compared with no loss in Population I (See Table IV-9).

Academic Disqualification

The principal causes for academic disqualification at this college for the years 1965-70 were (1) accruing a cumulative GPA ten or more points below a "C" average or (2) demonstrating by doing less than "D" average work that the student was ". . .not benefiting from college. . ." A student was eligible to return to college upon appeal and in probationary standing, after being away from the campus not less than one term.

Table IV-8 contains data on the number of times students in the study were disqualified. Only two of 401 successful students who left college "early" were disqualified (and obviously returned to improve their records.) Nineteen of the successful completers were on the disqualification roles one time, four twice and one three times. Nearly two-thirds of the unsuccessful students were never disqualified and most of the remaining twenty-four percent were only disqualified one time.

Summary: An obvious counseling department implication is inherent in the statistics of disqualification in this study and the numbers of those who eventually withdrew as unsuccessful students at the college.

Graduation of Population I

Table IV-9 displays the terms during which members of the successful completing group graduated with an Associate in Arts degree.

TABLE IV-9

TERM OF GRADUATION--POPULATION I AND COMPARISON GROUP

Enrollment Year	Population I #	 %	Comparison Group #	 %
Spring 67 (2 years)	130	25.14	183	7.93
Spring 68 (3 years)	95	18.38	124	5.37
Spring 69 (4 years)	11	2.13	27	1.17
Spring 70 (5 years)	5	.97	14	.61
Equivalent units and GPA but no A. A. degree	245	47.39	634	27.47
Still enrolled	31	5.99		

A total of 241 of this study's Population I received degrees, representing forty-seven percent of their numbers but less than twenty percent of the students sampled. Another forty-seven percent completed the equivalent in terms of units and grade point averages but not specific degree requirements. The persisters actually receiving degrees represented ten percent of the entire freshman class of 1965 but they represented sixty-nine percent of all 348 students in the class who ultimately received degrees.

Of the Population I recipients of degrees, 130 of them, less than six percent of the entering class, received the degree in the "normal" two-year time period widely believed to be the standard in community colleges; another 95, or four percent of the class, received the degree after three years of study and the remaining 16 students took four or more years.

Summary: Of all students classified as freshmen in 1965, only eight percent completed the requirements to receive an A.A. degree in two years, another five percent in three years, and an additional two percent received a degree within five years of entering college for a total of 348 students representing fifteen percent of their class, 241 of whom were among the study group's successful persister group.

Number of Terms Attended

While Table IV-10 (page 79) is self-explanatory these summary observations are appropriate.

1. Population I had the best record of attendance longevity. Not until the end of the second year did the first attrition take

TABLE IV-10

TERMS ATTENDED
5 YEARS

Last Term Attended	None	One		Two		Three		Four		Five		Six		Seven		Eight		Nine or more	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Population I								249	48.	111	21.	94	18.	21	4.	11	2.	31	6.
Cumulative										360	69.	454	87.	475	91.	486	93.	517	
Grad. [Cum]								130	25.			225	43.4			236	45.6	241	46.6
Popul'n II		21	5.	109	27.	54	14.	140	35.	43	11.	18	4.	5		5	1.	6	1.
Cumulative				130	32.	184	46.	324	81.	367	92.	385	96.	390	97.	395	98.	401	
Popul'n III		62	13.	163	34.	104	22.	98	21.	26	5.	14	3.	5	1.	2	.5	1	
Cumulative				225	47.	329	69.	427	90.	453	95.	467	98.	472	99.	474	99.5	475	
Total Group n=1393		83	6.	272	20.	158	11.	487	35.	180	13.	126	9.	31	2.	18	1.	38	3.
Cumulative				355	26.	513	37.	1000	72.	1180	85.	1306	94.	1337	96.	1355	97.	1393	
Comparison Group (n=2300)	36 1	338	15.	451	20.	264	11.	663	29.	259	11.	189	8.	47	2.	32	1.	31	1.
Cumulative		374	16.	825	36.	1089	47.	1752	76.	2011	87.	2200	95.	2245	97.	2277	98.	2308	

place for this group: that was the last term attended by nearly half the group, all of whom completed 60 or more units and of whom half actually received degrees ("on time"). By the end of three years a total of eighty-seven percent left the college having completed 60 or more units; again, half of these had been awarded degrees.

2. Population II, successful non-persisters, lost one-third of their numbers by the end of the first year; eighty percent had departed at the end of the second year and all but 16 students in three years.

3. Population III suffered nearly a fifty percent attrition the first year, seventy percent in three semesters, and ninety percent after only two years.

Summary: Certain of the findings of this chapter, displaying and discussing academic achievement, are significant.

Units attempted and completed. From the first term, the eventually unsuccessful students experienced difficulty maintaining units in which they were enrolled while both of the successful groups realized little loss. The successful non-persisters achieved the best record of completion of units attempted while they were enrolled. Of the entire study group of 1393 students, one-third failed to complete the equivalent of one year of work; the unsuccessful students outnumbered the successful withdrawers two-to-one in unit slippage.

In terms of grade point averages there was almost no difference between the successful completers and withdrawers. The unsuccessful students, however, experienced early and high percentages of below-average achievement.

Probation status was not reserved for the unsuccessful group, although every student in that group of 475 was on probation at least once. The successful withdrawers were on probation least of all groups. This study's total group probation record, like its disqualification record, was almost identical to the larger comparison group.

Disqualification was not a common occurrence for this study group, especially with the two successful groups. Neither, however, was disqualification common among the total comparison group. Only the unsuccessful student group was to realize a high percentage of disqualifications.

Graduation with a degree was an uncommon occurrence for both the study group and the 2300 student comparison group, and completion within two academic years was an achievement accomplished by fewer than eight percent of all students, three-fourths of whom are represented by this study's sample of Population I students.

In terms of academic achievement measurements reported herein, it can be concluded that the sample group as a whole appears not to be uniquely different from the entire class of students labeled as "freshmen" in 1965. Between the selected group of this study, however, are some obvious distinctions which make the two subgroups of successful students stand out as measurably different in academic achievement from the third and unsuccessful group.

CHAPTER V

PATTERNS OF RESPONSE TO THE APPRAISAL INSTRUMENTS

The purpose of this study was to design a procedure whereby entering college students' responses to ACT and OPI scales can be statistically treated so as to distinguish between those students who are more likely to "complete" a program and those who exhibit a propensity to become either successful withdrawals or unsuccessful withdrawals.

Two assumptions underlay the design of the study:

1. Grade Point Average (GPA) and units completed represent a contemporary measure of academic achievement.
2. Subsequent entering Freshman class members will possess basic characteristics comparable to those of the study group and a model for prediction is potentially useful.

Certain research questions preceded the hypotheses tested in the process of developing a predictor model:

1. To what extent does the American College Testing Service (ACT) instrument discriminate between those students who remain in college and those who withdraw?
2. To what extent does the Omnibus Personality Inventory (OPI) Intellectual Disposition Category (IDC) system discriminate between those students who remain in college and those who drop out of college?
3. Is there a relationship between "successful" and "unsuccessful" dropouts and the IDC criteria of the OPI?
4. Can the Composite and sub-test scores of the American College Testing Service (ACT) battery combine with the IDC scales of the OPI to increase the differentiation between persisters and dropouts?

I

THE AMERICAN COLLEGE TESTING PROGRAM (ACT) SUBJECT MATTER AREA AND COMPOSITE SCORES

The mean scores achieved on the ACT battery by study group students are displayed in Table V-1 (page 84). Also displayed in the same table are the scores of three normative sample groups: (1) a group of over one million college-bound high school seniors tested between 1962 and 1965; (2) a group of nearly forty thousand freshmen who entered 106 two-year colleges in 1963, 1964, and 1965; and (3) another group of nearly forty thousand freshmen who entered 125 different four-year colleges the same years. Standard scores of the study group compared with the normative sample groups are summarized in the following narrative.

English Test. The study group en toto achieved one-half a standard score above that of the two-year college normative group, one full score below the four-year group, and nearly two points below the "college-bound" group. However, this group's achievement was heavily weighted downward by the unsuccessful student sub-group which was nearly two scores lower than the entire group. The successful persisters and successful non-persisters scored equally as well as the four-year group and well above the two-year group.

Mathematics Test. Again the entire study group standard score was reflective of the poor scores in the unsuccessful subgroup; the total group score was above the two-year normative sample, not a full score lower than the four-year sample, and one score below all college-bound. Unsuccessfuls fell over three

TABLE V-1

MEAN SCORES AND STANDARD DEVIATIONS OF ACT SUBJECT MATTER AREAS AND COMPOSITE FOR STUDENTS ENTERING FOOTHILL COLLEGE FALL,1965, FOR THREE POPULATIONS OF STUDY GROUP FROM ENTERING CLASS OF 1965, AND FOR THREE NORMATIVE SAMPLE GROUPS

GROUP		ENGLISH	MATH	SOCIAL SCIENCE	NATURAL SCIENCE	COMPOSITE
Study Group n=1393	Mean	17.8	18.5	20.4	20.1	19.4
	S.D.	5.2	6.6	6.0	6.6	5.0
Study Group Pop I n=517	Mean	18.7	20.2	21.9	21.6	20.8
	S.D.	5.1	7.1	5.5	6.9	4.9
Study Group Pop II n=401	Mean	18.9	19.2	21.6	20.8	20.4
	S.D.	5.1	5.9	5.6	6.0	4.5
Study Group Pop III n=475	Mean	16.0	16.0	17.8	17.8	17.2
	S.D.	5.0	5.9	5.9	6.2	4.6
Table 2^z	Mean	19.5	19.6	21.1	21.0	20.4
	S.D.	N/A	N/A	N/A	N/A	N/A
Table 3*	Mean	17.2	17.4	18.4	18.7	18.1
	S.D.	5.1	6.0	6.1	6.1	4.8
Table $4^\#$	Mean	18.8	19.2	20.1	20.1	19.7
	S.D.	4.9	6.1	5.9	6.0	4.8

Notes: N/A = Not provided in research survey

Table 2^z = ACT tested student normative data, 1,290,812 college bound high school seniors tested between November 1, 1962 and October 30, 1965.[1]

Table 3* = ACT tested student normative data for freshmen who entered Level I (two year) colleges, based upon 39,774 students tested in 1963, 1964, or 1965.[2]

Table $4^\#$ = ACT tested student normative data for freshmen who entered Level II (4-year baccalaureate awarding) colleges, based upon 39,985 students at 125 colleges.[3]

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[1] Using ACT in Secondary Schools, A Handbook for Counselors, (Iowa City, Iowa: The American College Testing Program, Inc., 1966), p. 8.

[2] Ibid.

[3] Ibid.

scores below four-year and one and one-half scores below two-year comparisons. Successful withdrawers, on the other hand, scored nearly two scores above their two-year comparison counterparts and on par with four-year norms. The successful persisters scored markedly well: nearly three scores above two-year and one full score above four-year groups.

Social Science Test. As in the mathematics sub-test, the successful students distinguished themselves by exceeding the standard scores of all three normative sample groups; they ranked nearly one score higher than college-bound youth, three and one-half scores above other two-year entrants, and one and one-half scores above four-year entrants. The successful leavers held almost identical degrees of superiority in scores. The unsuccessful students, although scoring "best" in this sub-test, still fell three, one-half, and two and one-half points below college-bound, two-year and four-year groups.

Natural Sciences Test. Once more the successful students scored measurably higher than all three comparison samples quoted by ACT Inc.; in the case of the other two-year entrants, this group was three scores higher in results. The successful withdrawers were superior on two of three comparisons but the unsuccessful students' marks were significantly low.

Composite Score. As became obvious on the four sub-tests, the entire study group composite mean score was adversely affected by the 475 students who became unsuccessful achievers in their first college experience; yet the "performance" of the two successful groups reduced this difference significantly.

The successful persisters, having fallen short of the normative groups on only two of twelve sub-test measures of mean score "achievement (-.8 and -.1 on English sub-test compared with the college-bound and four-year students respectively), established composite scores which were +.4, +2.7, and +1.1 better than the three normative groups of college-bound, two-year entrants and four-year entrants. The successful non-persisters were identical in mean score to the college-bound group but excelled the other two by +2.3 and +.7 scores. The unsuccessfuls from this study were woefully short with mean scores falling -3.2, -.9, and -2.5 respectively.

Summary. The total group on which this study has focused achieved mean scores on the ACT battery not significantly different from those of other college-bound students tested during a three-year period ending in the fall of 1965 (see Table V-1). Compared with other students who entered two-year colleges this group recorded higher scores in all tests; compared with those who entered four-year colleges the entire group was nearly comparable; compared with one million (plus) college-bound seniors they fell one score or less on all save the English sub-test score.

Within this study's sample, however, an obvious dichotomy in mean score distribution is evident. Students who are defined as successful persisters excelled all three normative sample groups on all (5) scales with two minor exceptions, while the study's successful non-persisters excelled on ten of fifteen possible comparisons, achieved the same score on two and fell below comparative means on the remaining three. By contrast, the *unsuccessful non-persisters* scored one standard score below all other two-year entrants (one-half score on the Social Science sub-test), two-to-three scores lower than all four-year entrants and three or more scores below all college-bound youth. The degree of difference for each of the Populations and the total group is the display in Table V-2.

TABLE V-2

DIFFERENCES IN ACT STANDARD SCORE MEANS FOR STUDENTS ENTERING FOOTHILL COLLEGE, FALL 1965, AND THREE NORMATIVE COMPARISON GROUPS*

	Composite	English	Math	Soc.Sci.	Nat.Sci.
Study Group n=1393	(2^{z}) -1.0	-1.7	-1.1	- .7	- .9
	(3*) +1.3	+ .6	+1.1	+2.0	+1.4
	(4#) - .3	-1.0	- .7	+ .3	n/c
Pop. I (n=517)	(2^{z}) + .4	- .8	+ .6	+ .8	+ .4
	(3*) +2.7	+1.5	+2.8	+3.5	+2.9
	(4#) +1.1	- .1	+1.0	+1.8	+1.5
Pop. II (n=401) "Successful W/D"	(2^{z}) n/c	- .6	- .4	+ .5	- .2
	(3*) +2.3	+1.7	+1.8	+3.2	+2.1
	(4#) + .7	+ .1	n/c	+1.5	+ .7
Pop. III (n=475) "Unsuccessful W/D"	(2^{z}) -3.2	-3.5	-3.6	-3.3	-3.2
	(3*) - .9	-1.2	-1.4	- .6	- .9
	(4#) -2.5	-2.8	-3.2	-2.3	-2.3

Three score differentials for each group and on each test are compared in respective order with normative sample groups defined in Table V-1 as Table 2^{z} College-bound high school seniors; Table 3 College entrants; and Table 4# Four-year college entrans, *Using ACT . . .1966* p. 8. (*op. cit.*).

n/c = No change from comparison group mean.

ACT Scores and Percentile Rankings.

Standard scores achieved on the ACT battery are useful for counseling interpretations, for measurement of educational growth and for comparative purposes; their conversion to percentile rankings based on national norms is also of value, particularly as entering-student profile information for counseling and guidance functions. The ACT Handbook for Counselors (1966) notes that because of imperfection in any test instrument, student scores should be considered approximations and that ACT test scores should be treated with such caution. The Handbook further notes: "The standard error of measurement on the ACT tests is approximately 2; on the composite it is about 1. This means an ACT English score of 20 should be thought of as in the range of 18 to 22, and the composite of 19 would be in a range of 18 to 20."

The ACT standard scores, when converted into percentile ranks, facilitate comparing a group's performance on the several tests with other groups and tell what percent of students in a given group scored lower or higher than a comparison group—in this case, the national normative sample of 39,774 students who enrolled into two-year colleges from 1962 to 1965.

For this study, Table V-3 (page 90) again displays the raw scores for each sub-test and the composite and incorporates (1) the percentile rank which each group mean score represents, and (2) the range of rank by percentile. This range thus provides a "band" of percentile ratings which most fairly represents the student group potential. The Handbook's Table of Percentile Ranks for Level I

Institutions was the basis for determining and interpolating both the mean score percentile equivalent and the ±2 standard score range. The following observations summarize Table V-3, a comparison of the study group(s) with other 1963-65 two-year college entrants (USOE Level I) and ACT defined national norms.

Population I, successful persisters. Consistent with the individual scores analyzed above, this group of students achieved higher percentile rank and range in all tests except the English test when compared with other groups within this study and outside comparison groups. While they were significantly "superior" to their classmates who withdrew successfully only in mathematics and natural science tests (six percent and four and two-tenths percent higher), they far outscored those who were eventually unsuccessful.

In the four tests (English, Mathematics, Social Science, and Natural Science) they exceeded national norms for Level I examinees by twelve percent, sixteen percent, twenty percent, and sixteen percent. It is also noteworthy that this group's scores on the four tests and the composite score were superior to all similar scores of Level II (four-year college) entrants and superior to college-bound seniors, in all except English test scores, and that slippage by only the slightest margin.

Population II, successful non-persisters. While this group scored five percent or more lower than Population I on the mathematics and natural science tests, they "looked" very much like them in overall performance. This group's percentile scores exceeded all Level I scores by ten percent to nineteen percent, and

TABLE V-3

MEAN SCORES, STANDARD DEVIATIONS AND PERCENTILE RANGE OF ACT SUBJECT MATTER AREAS AND COMPOSITE FOR STUDENTS ENTERING FOOTHILL COLLEGE FALL, 1965 AND NORMATIVE GROUP COMPARISON POPULATION

	ENGLISH			MATHEMATICS			SOCIAL SCIENCE			NATURAL SCIENCE			COMPOSITE		
GROUP	ACT Score σ	%ile	Range¥ %ile	ACT Score σ	%ile	Range %ile	ACT Score σ	%ile	Range %ile	ACT Score σ	%ile	Range %ile	ACT Score σ	%ile	Range %ile
Study Group n=1393	*17.8* *5.2*	51.4	43.4 60.2	*18.5* *6.6*	60.0	53.5 66.5	*20.4* *6.0*	61.4	55.4 67.0	*20.1* *6.6*	56.6	51.5 62.5	*19.4* *5.0*	59.8	52.2 66.8
Pop. 1 n=517	18.7 5.1	59.3	42.6 74.9	20.2 7.1	69.0	58.2 77.8	21.9 5.5	69.5	58.4 80.5	21.6 6.9	65.0	54.0 76.0	20.8 4.9	69.6	62.6 76.6
Pop. 2 n=401	18.9 5.1	61.1	44.2 76.3	19.2 5.9	63.0	51.4 73.1	21.6 5.6	68.0	56.6 79.0	20.8 6.0	60.8	49.6 71.8	20.4 4.5	66.8	59.8 73.8
Pop. 3 n=475	16.0 5.0	37.0	24.0 53.0	16.0 5.9	43.0	28.0 57.0	17.8 5.9	45.8	33.0 57.8	17.8 6.2	42.8	32.0 55.0	17.2 4.6	42.6	35.4 50.6
Table 3[1]	17.2 5.1	46.7	31.5 63.7	17.4 6.0	52.8	38.2 65.0	18.4 6.1	49.4	36.8 61.4	18.7 6.1	48.9	36.5 60.2	18.1 4.8	49.8	41.8 57.7

¥ "The standard error of measurement on the ACT tests is approximately 2; on the composite it is about 1...This means an ACT English score of 20 should be thought of as in a range of 18 to 22, and the composite of 19 would be in a range of 18 to 20."[1]

Table 3 = ACT tested student normative data for freshmen who entered Level I (two-year) colleges, based upon 39,774 students tested in 1963, 1964, or 1965.

[1] Using ACT in Secondary Schools, A Handbook for Counselors, (Iowa City, Iowa: The American College Testing Program, Inc., 1966), p. 7.

they surpassed all Level II scores and equalled all college-bound students.

Population III, unsuccessful non-persisters. This group of students fell from four percent to thirteen percent below the two-year college median on all tests and scored at only forty-two and six-tenths percent on the composite score. There may be some genuine significance for counseling and course advising appropriate to the English test scores: This group scored at only the 37th percentile, an immediate signal that skills in effective expression, writing, and comprehension are weak and underdeveloped. Such weakness, magnified in all subject areas in a vocational or liberal arts curriculum, undoubtedly has influence on the degree of success in meeting college performance standards and, consequently, on the longevity of stay on a campus.

Percentile range, all subjects. Interpolating from the ACT score and percentile rank a percentile-range (see Manual, p. 7, op. cit.) interesting and noteworthy contrasts between successful and unsuccessful students are revealed.

At the lower end of the percentile-range continuum, successful completers scored well above the median on all except English scores and approximately twenty percent above median on mathematics and social science tests, indicating high quantitative skills and reading comprehension. At the higher end of the range this group's potential rank was between the 75th and 80th percentile on all tests.

As noted earlier, the successful non-completers look much like the completers: Their lower percentile-range plateau was slightly superior in English skills (although below the national norm) but lower than Population I on all other areas. Their upper range on all tests clustered near the 73rd percentile.

The unsuccessful students' percentile range was twenty-four percent to fifty-eight percent; at best they scored above the median given the tolerance of a standard error of measurement of two. This group performance on any single measure—standard score, percentile rank, or percentile range—was obviously lower than either of the two groups of classmates and lower than the national norms on every test area, and increasingly so as the number of measures (score, rank, and range) broadened the potential for comparison. A later conclusion with implications for counseling has been drawn.

II

THE OMNIBUS PERSONALITY INVENTORY INTELLECTUAL DISPOSITION SCALES

Chapter one described tha applicability and use of the Omnibus Personality Inventory, its theoretical foundation, and the rationale for its use in this study. A review of six scales from the instrument and their significance in measuring the potential domain of subjects responding to the instrument is noted below followed by displays of responses of subjects in this study.

The Omnibus Personality Inventory ". . .was constructed to assess selected attitudes, values and interests, chiefly relevant in the areas of normal ego-functioning and intellectual activity. Almost all dimensions included in the inventory were chosen either for their particular relevance to academic activity or for their general importance in understanding the differentiating among students in an educational context."[1]

The particular focus of this research has been to employ the Intellectual Disposition Categories of the OPI as independent variables in a predictive equation to assess persistence potentials of college students. As recited earlier, the IDC system is one way of classifying persons at certain "points on a 'continuum' of intellectual disposition" and thereby assess a syndrome of intellectual interests or the potential for behaving intellectually. Persons "distributed" among the eight categories of the dimension of intellectuality are theorized to be the products of a variety of background experiences who have distinctly dissimilar orientations toward learning and scholastic activities. The categorization makes use of six scales, four of which are primary criteria and two of secondary criteria. To appreciate both the obvious and the subtle findings displayed in subsequent tables related to this study, a definition and comparative descriptor of each of the six scales (page 94) is appropriate.

This study's assessment of the potential for successful academic achievement of its subjects emphasized measuring both conventional academic performance potential (ACT scales) and intellectual interests (OPI scales) of incoming students. To determine how the three subject groups of students might differ in their intellectuality the Index of Intellectual Disposition defined by Heist et. al. was employed. Appendix C-1 displays the criteria for determining IDC's from standard scores.

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[1] OPI Manual, op. cit., p. 4.

Brief Scale Descriptions.[2]

Thinking Introversion (TI). A measure of preferences for reflective, abstract thinking. High scores characterized by a liking for reflective thought and academic activities: their thinking tends to be less dominated by external conditions and generally accepted ideas than that of the extroverts who are low scorers. High scorers display an interest in a variety of ideas for their own sake; low scorers tend to evaluate ideas for their practical, immediate application. The scale appears to measure general appreciation of and interest in scholarly activities.

Theoretical Orientation (TO). A measure of an interest or orientation to a more restricted range of ideas than TI, especially with a focus on science and the use of scientific method in thinking. High scorers are generally logical, rational, critical in approaching problems.

Estheticism (Es). A measure of interest in esthetic experiences. High scorers indicate diverse interests in artistic matters and activities. Statements endorsed in this battery extend beyond painting, sculpture, and music to include interests in literature and drama.

Complexity (Co). A measure of the extent of intellectual curiosity and tolerance for ambiguity, of an experimental perceptual orientation rather than a fixed way of viewing and organizing phenomena. High scorers tolerate ambiguities, novel situations and ideas, and are aware of subtle variations in patterns of stimuli. Low scorers prefer sure, simple, and structured situations.

Autonomy (Au). A refined measurement of traits measured by two other batteries of the OPI, (not included in this study but labeled as "Nonauthoritarian" and "Social Maturity") these items measure a tendency toward autonomous, independent, unbiased, open, and flexible thinking. High scorers tend to be independent of authority as traditionally imposed through social institutions, and they oppose infringements on the rights of individuals. They are objective, realistic, and intellectually liberal.

Religious Liberalism (RL). [In more recent versions of the instrument, called Religious Orientation.] An assessment of religious beliefs and related attitudes to determine the degree of commitment to fundamentalistic thinking. High scorers are skeptical of conventional religious beliefs and tend to reject most of them, particularly the orthodox and fundamentalistic. Those scoring near or above the mean manifest a liberal view and low scorers tend to be generally conservative and rejecting of other viewpoints.

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[2] Descriptors are quoted or paraphrased from the Manual, p. 4 et. seq.

DESCRIPTIONS OF CHARACTERISTICS COMMON TO HIGH/LOW OPI RESPONDERS[3]

	High Score Descriptors	Low Score Descriptors
[TI]	Enjoy thought-provoking lectures; mull over ideas presented in class; examine and analyze self motives and reactions; questions teacher statements and ideas; interested in history of human thought; like unique tests.	Dislike reading serious or philosophical works, serious poetry, writing reactions to these, or spending leisure writing essays; prefer short, factual questions to those requiring interpretation.
[TO]	Interests include reading in science; are generally logical, analytical, critical; enjoy research; prefer ideas man to practical man.	Do not like reading scientific or mathematical or writing on possible outcomes of research discoveries; prefer having theory explained than to understand it alone; prefer short to long problems.
[Es]	Enjoy poetry, painting, sculpture, architecture, collecting prints, reading of achievements in these fields; have tried writing.	Do not read about artistic or literary feats, or seek time for painting or sculpture, do not seek friendships with sensitive or artistic;would not aspire to acting.
[Co]	Will take a chance without knowing if it will work; play with new ideas even if eventually non-productive; undertake projects whose outcome is unknown or unsure.	Prefer the certain and predictable; do not hate regulations; are not politically radical; prefer pleasant friends to those always involved; prefer straightforward reason to analogies/metaphors.
[Au]	Feel disobedience to government sometimes justified; deny that only a fool would change American way of life, or that communism is the most hateful world condition or that one without religious feeling is somehow wrong.	Feel parents generally know best, that youth who get rebellious ideas ought to outgrow them, that established leaders should maintain order, that only calloused persons do not love parents.
[RL]	Deny being wary of those who claim not to believe in God or that there is something wrong with those lacking religious feeling; deny total faith in supernatural, or the existence of one true approach to God.	Believe God exists, that He hears prayer, and that what one believes does matter; do not want to be skeptics or agnostics; prefer associates who are religious people.

[3] *Ibid.*

IDC Mean Scores Analyzed

Tables V-4 through V-7 (pages 97-100) display the mean and standard deviations of standard scores for Population I (Successful), II (Successful withdrawers), and III (Unsuccessful withdrawers) and a composite for the total study group. [For comparative purposes the ACT sub-test and composite scores are included.]

Simply stated, there were no extremes in IDC scores, and only nominal differences between groups, especially successful students. All scores for the three populations clustered at the mean* with the greatest variance from the mean evidenced by Population III which fell only 1.55 percent and 1.95 percent from the mean on its two "lowest" scores. Two statements from pages four and ten respectively of the Manual (op. cit.) need repeating at this point for commentary elaboration.

> The point at which any score may be defined as a high score is relative. The only common basis one can use across schools and sections of the country is the normative table. On most scales standard scores of 60 (84th percentile) or above are interpreted as sufficiently high for the essence of the respective definition to apply. . . .
>
> [Because the normative table may be]. . .overbalanced by . . . colleges and universities who select all of their enrollees from the top ten to fifteen percent of secondary school graduates. . .the standard scores presented [in the normative table]. . .may be above the average of college freshmen.

Our observation is that each group-qua-group looked like each other group in this sample; that given the authors' qualification of possible "overbalancing," the students comprising the groups are at least "at the norm" for colleges sampled; that no one group can be considered uniquely "high" or "low" in measurement; and

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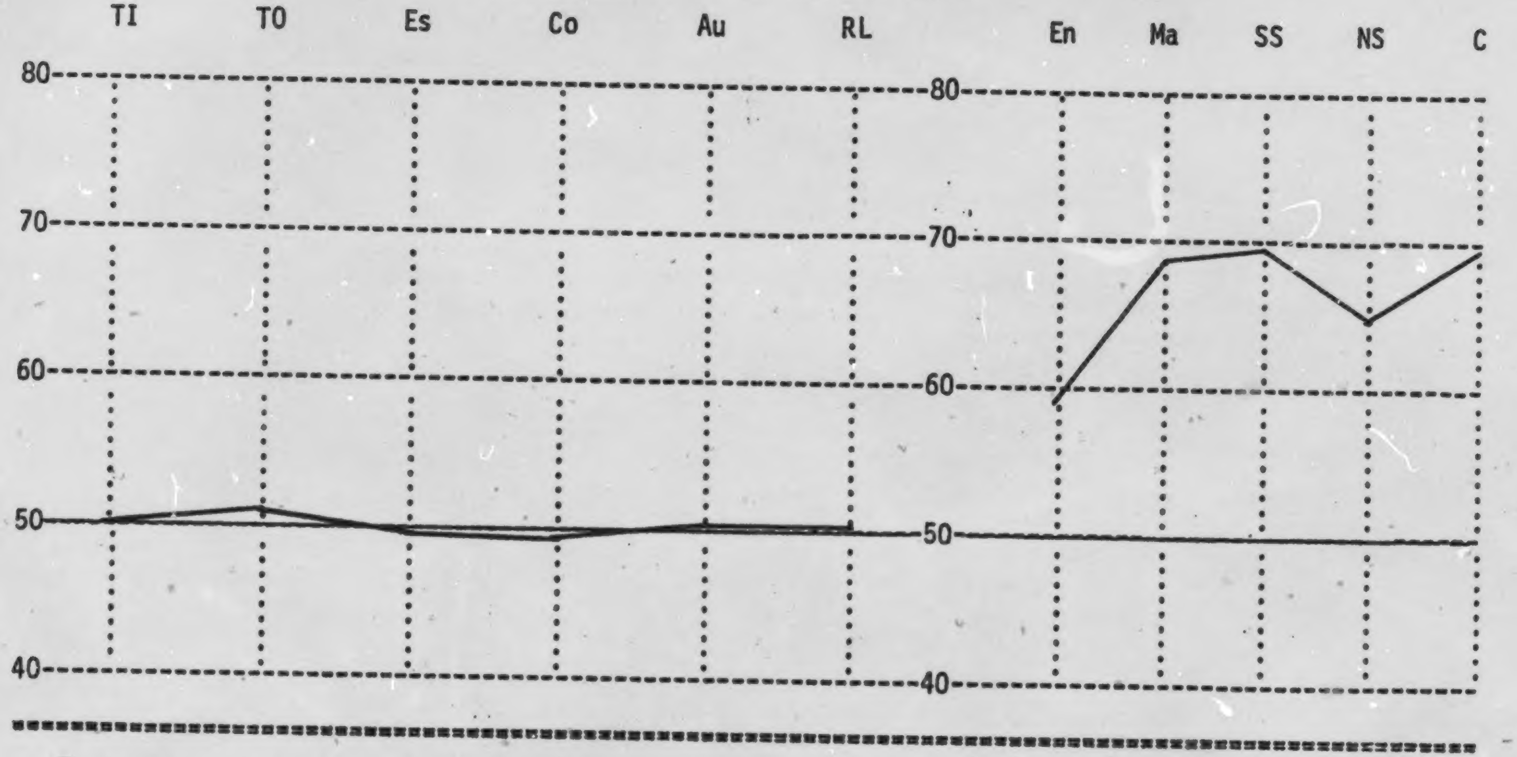
*Norms for 7283 college freshmen and women from 37 diverse colleges and universities including four junior colleges.

TABLE V-4

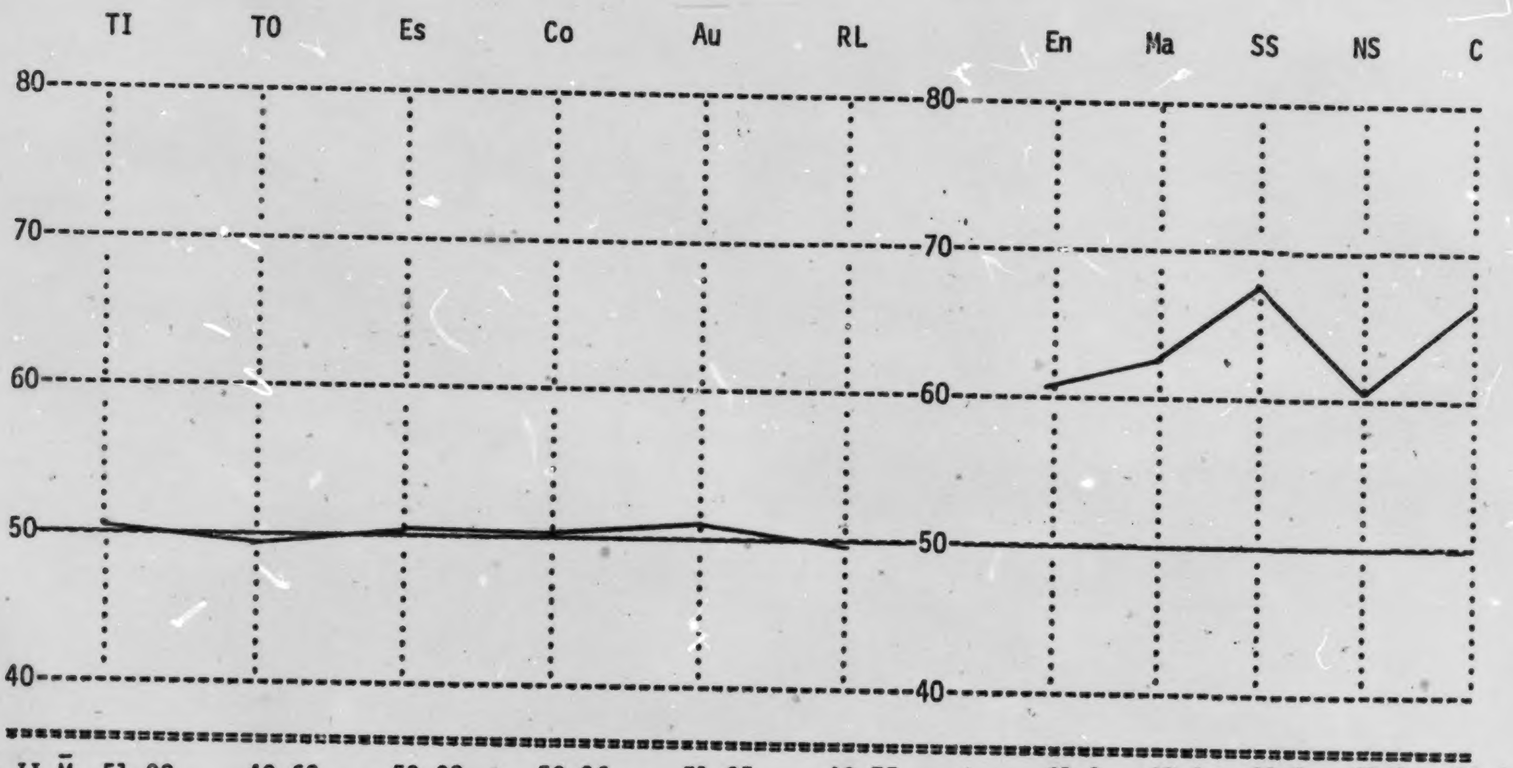
POPULATION I -- IDC AND ACT MEANS



		TI	TO	Es	Co	Au	RL	En	Ma	SS	NS	C
Pop I	$\bar{M}$	50.14	51.22	49.95	49.78	50.83	50.21	59.3	69.0	69.5	65.0	69.6
	σ	9.85	9.32	9.96	9.79	9.70	9.60					

TABLE V-5

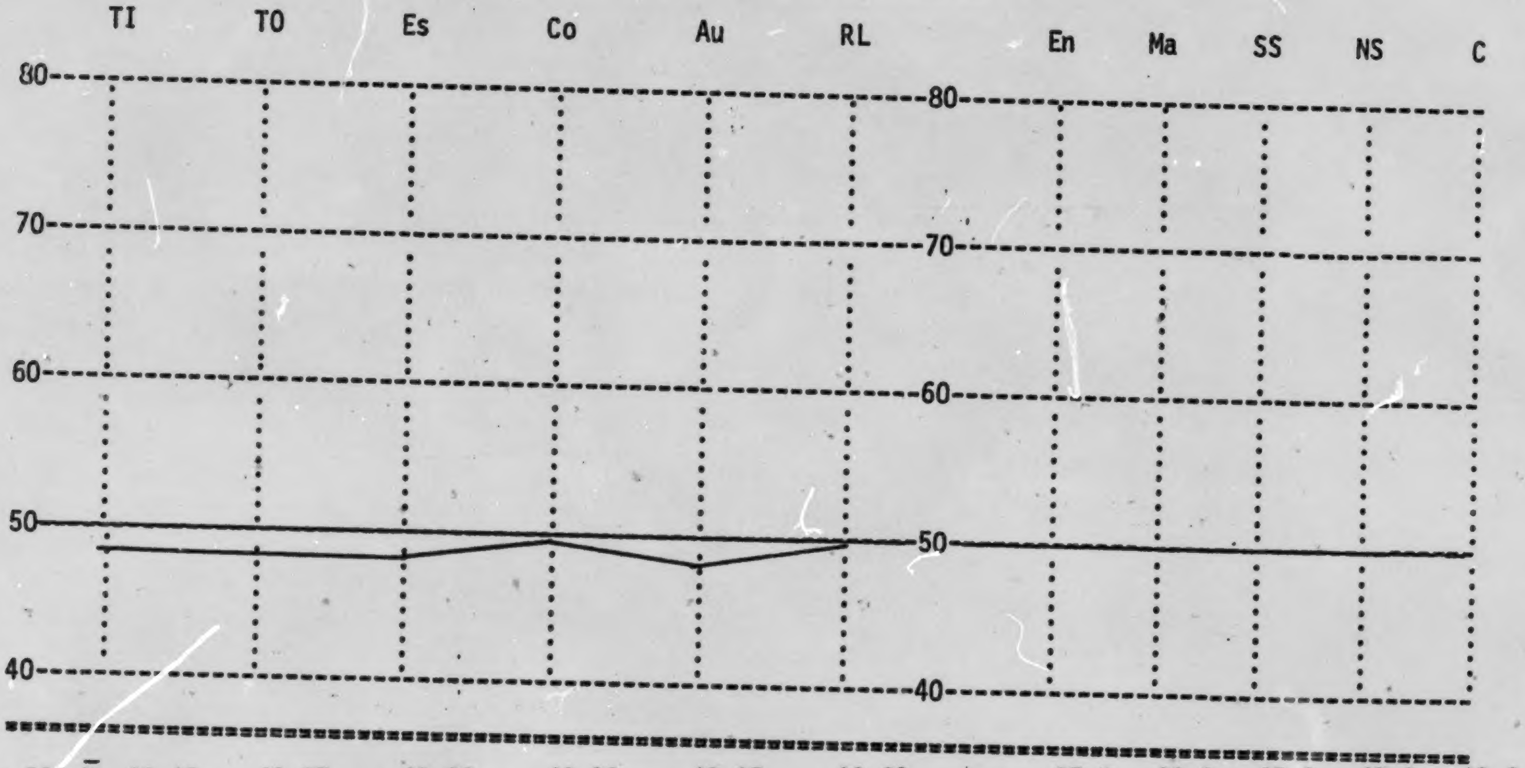
POPULATION II -- IDC AND ACT MEANS



		TI	TO	Es	Co	Au	RL	En	Ma	SS	NS	C
Pop II	$\bar{M}$	51.00	49.63	50.98	50.36	51.05	49.75	61.1	63.0	68.0	60.8	66.8
	σ	9.78	10.12	10.12	10.03	10.15	10.58					

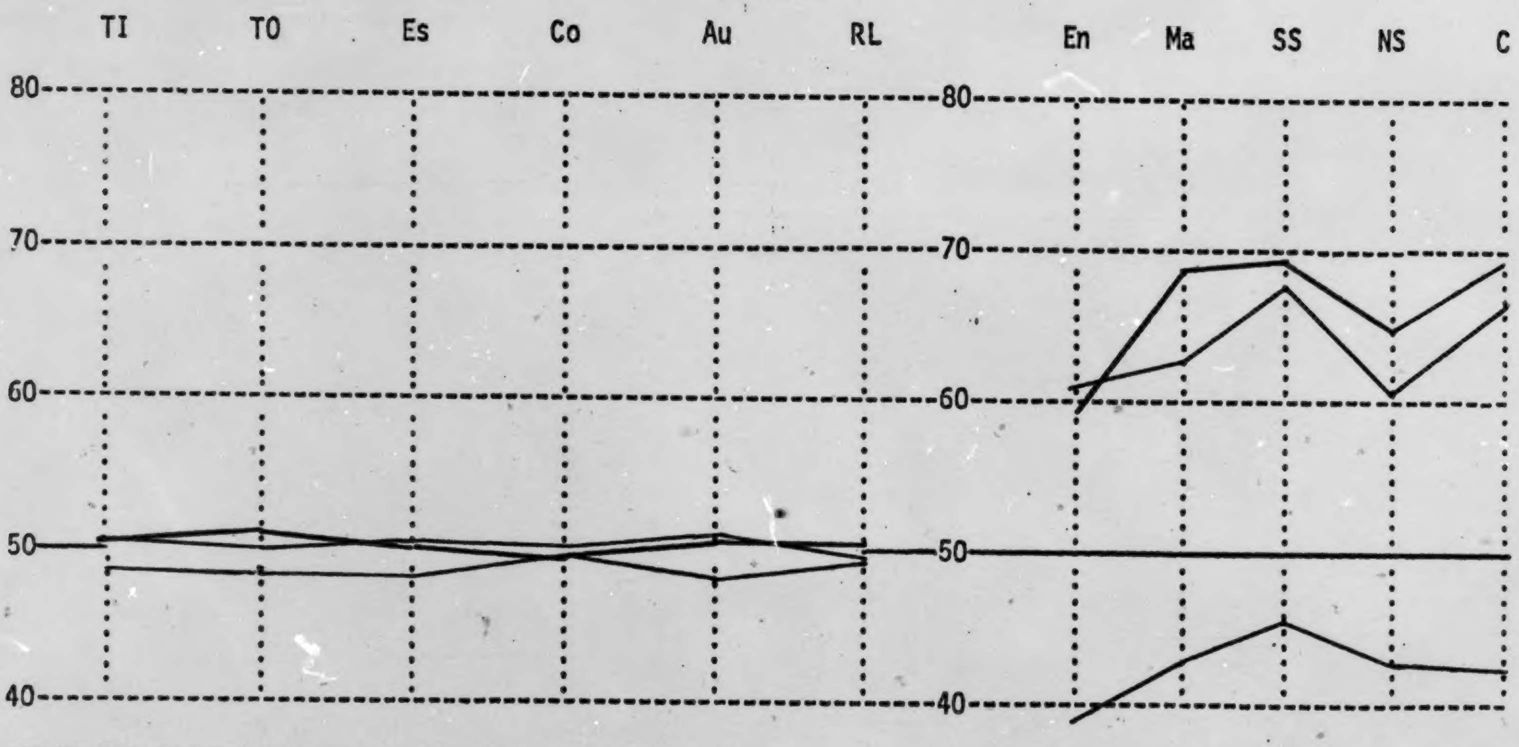
TABLE V-6

POPULATION III -- IDC AND ACT MEANS



		TI	TO	Es	Co	Au	RL	En	Ma	SS	NS	C
Pop III	$\bar{M}$	48.45	48.87	48.86	49.86	48.05	49.68	37.0	43.0	45.8	42.8	42.6
	σ	9.57	9.62	9.49	9.80	10.01	9.64					

TABLE V-7
ALL GROUPS



		TI	TO	Es	Co	Au	RL	En	Ma	SS	NS	C
Pop I	$\bar{M}$	50.14	51.22	49.95	49.78	50.83	50.21	59.3	69.0	69.5	65.0	69.6
	σ	9.85	9.32	9.96	9.79	9.70	9.60					
Pop II	$\bar{M}$	51.00	49.63	50.98	50.36	51.05	49.75	61.1	63.0	68.0	60.8	66.8
	σ	9.78	10.12	10.12	10.03	10.15	10.58					
Pop III	$\bar{M}$	48.45	48.87	48.86	49.86	48.05	49.68	37.0	43.0	45.8	42.8	42.6
	σ	9.57	9.62	9.49	9.80	10.01	9.64					
All	$\bar{M}$	49.80	49.95	49.86	49.99	49.96	49.89	51.4	60.0	61.4	56.6	59.8
	σ	9.79	9.71	9.88	9.86	10.03	9.90					

that in viewing reference points established by each group and the collective groups, "profiles" lead to no significant distinguishing differences between the groups either scale-by-scale or on the totality of the IDC measure. The isolated comparison of any two populations does not contribute significantly to any meaning of the patterns and only generalized conclusions may be drawn from the "performance" patterns displayed on the IDC composite.

To check against possible vagaries in mean scores due to sample size or some unanticipated distortion, a random sample of 50 students from each population was drawn using a table of random numbers. The mean scores and sigma of each population were again computed with the following results.

		TI	TO	ES	CO	AU	RL
Total I	M	50.14	51.22	49.95	49.78	50.80	50.21
n=512	σ	9.85	9.32	9.96	9.79	9.70	9.60
Random	M	50.40	50.40	49.90	49.80	51.68	49.66
n=50	σ	10.82	10.24	10.22	10.30	10.08	9.19
Total II	M	51.00	49.63	50.98	51.36	51.05	49.75
n=401	σ	9.78	10.12	10.12	10.03	10.15	10.58
Random	M	50.98	49.44	50.38	50.80	51.54	49.48
n=50	σ	10.28	10.08	11.25	11.05	9.74	10.34
Total III	M	48.45	48.87	48.86	49.86	48.05	49.68
n=475	σ	9.57	9.62	9.40	9.80	10.01	9.64
Random	M	49.74	48.76	49.26	49.46	46.46	49.02
n=50	σ	9.83	8.75	10.18	10.61	9.01	9.98

Only the Autonomy scale for the unsuccessful (Population III) students shows any effective change in size or dimension; all other differences were less than one percent, many less than .005 percent.

A detailed individualized examination was made of each of the random selections within each of three populations by this investigator and Dr. Paul Heist. To be sure, there were unique individuals to be observed; there were decided introverts and extroverts; high and low achievement-oriented men and women; students highly self-directed and independent and students constrained, intolerent and unable to break away from the fundamentalistic or orthodox family pattern; yet these individuals existed in each group and in almost similar numbers and proportions.

Returning to an examination of Tables V-4 through V-7, the first concentration is on the eventually unsuccessful students who exhibited a nearly flat profile on IDC scale items. Thinking Introversion scores (indicating a capacity for ideas, for the serious or philosophical, and for the organization of one's thoughts) were one of the two "lowest" measures for this group, but only 1.55 percent below the mean. This is not inconsistent with their scores on the ACT English scale which placed them at the 37th percentile on national norms, and tends to support the social science score placing them in the near-46th percentile. This group's Theoretical Orientation score, measuring a liking for science and mathematics and scientific methodology, measured slightly higher than the TI score, 1.13 percent below the mean and not inconsistent with ACT math/science scores placing them in the 43rd and 46th percentile.

Group III scored noticeably low on the ACT scales; their potential normative percentiles ranged from the 24th percentile at worst to the 58th percentile at best (Note again Table V-3). This group's readiness for intellectual involvement suggests something of a higher expectation level as measured by OPI scales than evidenced by their ACT performances. The caution needs to be advanced here that intellectual orientation is not synonymous with academic achievement since the latter can be measured and weighted. Further, Clark _et_. _al_. (1972) commenting on findings of a longitudinal study of nearly 4,000 students attending eight diverse colleges and universities, observed that "General academic aptitude is only moderately correlated with IDC. . . ."

The two groups of successful students, the completers and the withdrawers, while scoring at or slightly above the mean on nearly all measures, are almost indistinguishable except in terms of direction of the profile plot line. While the two groups' TI scores (measuring interests in the world of abstract ideas), and TO scores (measuring an affinity for math/science) were within two points of each other, their dimension of difference, however slight, was opposite; completers were lower on TI and higher on TO, implying a slightly better interest in or disposition toward learning. Any further generalization on those slight differences, however, is risky at best and hazards being contrived. The successful non-completers' scores on scales representing non-authoritarianism (Au and RL) place that group just slightly more conservative and authoritarian than completers; again the degree of difference between the two groups is acknowledged as slight.

In summary, groups I and II, successful students with differences in persistence, are "about average" on IDC scales in terms of learning readiness, potential for conducting scholarly activities, and their readiness for dealing with academic experiences. Interestingly, Clark's observation (above) on general academic aptitude gains merit at this point, for the ACT mean scores for both these groups significantly exceed the mean of all three ACT comparison groups noted in the earlier chapter—other two-year collegians, four-year entrants, or all college-eligibles. Compared with the unsuccessful student group, these two groups can be said to exhibit the greater interest and propensity for ideas and a greater degree of autonomy, but not particularly greater self-assurance. None of the IDC items indicated any solid promise of prediction of college performance for any group.

IDC Groupings.

At the outset of this research, and based upon evidence in the literature on research and experimentation in education utilizing measurements of personality characteristics, it was hypothesized that the relationship of student persistence to certain levels of intellectual potential as measured by the IDC scales of the Omnibus Personality Inventory would be clearly identifiable. What actually occurred with the subjects in this study was not anticipated.

Table V-8 (page 106) displays the eight categories and the numbers/percentages in each cell by populations, and the percent that each cell is to the total group.

The first evidence of some disparity between student groups, however modest, begins to appear. The successful student groups I and II appear nearly alike in terms of within-group percentages in each category and percentages of the total study population while the unsuccessful group begins shifting in a downward direction with IDC position 3. Table V-9 magnified the distribution.

Groups I and II, successful students, have a higher percentage of their numbers in the "above average" potential categories compared with group III; similarly, they represent a higher percentage of the total group albeit not dramatically higher. The "average" categories include higher percentages of successful completers on both within-group and total group samplings. Within "below average" categories Population I again has the fewest of its members. Completely unexpected was the discovery that for each student group, the total percent who fell below average on IDC scales exceeded half the students.

Institutional Comparisons.

The study by Clark et. al. included a measure of IDC by students attending eight diverse colleges and universities across the country. Acknowledging that students attending those particular institutions are, in general, not randomly distributed but that certain types of students are more likely to be found at some institutions than at others, one comparison between student populations of this present study with those of Clark et. al. is made. It is simplistic and overgeneralization to say that any one group

TABLE V-8

DISTRIBUTION OF SUBJECTS BY INTELLECTUAL DISPOSITION CATEGORY (IDC) SCORES

Categories 1 - 8 Individually

IDC Group	Pop I		%*	Pop II		%	Pop III		%	Total Group	
	No.	%	G	No.	%	G	No.	%	G	No.	%
1	6	1.16	.4	5	1.25	.4	5	1.05	.4	16	1.15
2	22	4.26	1.6	22	5.48	1.6	20	4.21	1.4	64	4.59
3	41	7.93	2.9	28	6.98	2.0	19	4.00	1.4	88	6.32
4	85	16.44	6.1	60	14.96	4.3	59	12.42	4.2	204	14.64
5	96	18.57	6.9	69	17.21	5.0	65	13.68	4.6	230	16.51
6	209	40.43	15.0	165	41.15	11.8	239	50.32	17.2	613	44.01
7	53	10.25	3.8	39	9.73	2.8	49	10.32	2.5	141	10.12
8	5	.96	.4	13	3.24	.9	19	4.00	1.4	37	2.66
Total	517	100%	37.1	401	100%	28.8	475	100%	34.1	1393	100%

* %G = Percent of total group of n=1393

TABLE V-9

DISTRIBUTION OF SUBJECTS BY INTELLECTUAL DISPOSITION CATEGORY (IDC) SCORES

Cluster Categories 1-3, 4-5, 6-8 *a priori*

IDC Group	Pop I		%*	Pop II		%	Pop III		%	Total Group	
	No.	%	G	No.	%	G	No.	%	G	No.	%
1-3	63	13.35	4.9	55	13.71	4.0	44	9.26	3.2	168	12.06
4-5	181	35.01	13.0	129	32.17	9.3	124	26.10	8.8	434	31.15
6-8	267	51.64	19.2	217	54.12	15.5	307	64.64	22.1	791	56.79
Total	517	100%		401	100%		475	100%		1393	100%

* %G = Percent of total group of n=1393

from this study "resembles" another group from the Clark study without first recognizing there are a multiplicity of reasons why students choose to attend a college or university. Given the "open door" nature of the California Community College system, however, the more restrictive admissions standards of the California State College system and the even more limited enrollment quotas of the University of California, it seems not unfair to seek some signs of difference or similarity between this study's populations and representative institutions of the State's four-year institutions. The purpose of such an exercise is to compare the dimension of the IDC's of this study's groups with other collegians. Table V-10 (page 108) applies.

The IDC cluster percentiles for this study's successful students, both the completers and the dropouts, do very much resemble those of two large public institutions in California, the University campus in Berkeley and the San Francisco State College campus. Even the unsuccessful students in this study responded to the OPI in such a manner as to suggest they, too, could have been assimilated into the large and complex campus of the State College in San Francisco and have found a place in one of its many student subcultures. As a total sample, the 1393 students in this study "fit" between IDC descriptors for Clark's Berkeley and San Francisco samples. These observations support the notion that the heterogeneity of students at this particular California community college is not unlike that of the large, complex, dynamic, multidisciplined four-year university neighbors and that the students attending this

TABLE V-10

FRESHMEN IDC GROUPINGS, BY INSTITUTIONS ATTENDED, IN PERCENTAGES: CLARK, *et.* *al.* STUDY

Institution	Below Average (IDC 6, 7, 8)		Average (IDC 4, 5)		Above Average (IDC 1, 2, 3)	
	n	%	n	%	n	%
Antioch	(37)	24	(76)	48	(44)	28
Reed	(9)	17	(11)	20	(34)	63
Swarthmore	(37)	22	(74)	45	(54)	33
S.F. State	(48)	69	(17)	24	(5)	7
U. C.	(164)	46	(147)	41	(45)	13
U. O. P.	(76)	70	(26)	24	(6)	6
St. Olaf	(183)	64	(87)	30	(18)	6
U. Portland	(76)	85	(12)	13	(1)	1
Total	(630)	49	(450)	35	(207)	16

FRESHMEN IDC GROUPINGS, BY POPULATION I, II, III FOOTHILL COLLEGE STUDY

	Below Average (IDC 6, 7, 8)		Average (IDC 4, 5)		Above Average (IDC 1, 2, 3)	
	n	%	n	%	n	%
Population I	267	52	181	35	69	13
Population II	217	54	129	32	55	14
Population III	307	65	124	26	44	9
Total	791	57	434	31	168	12

two-year institution probably bring as many diverse purposes, styles, needs, and aspirations as their friends who attend four-year campuses.

Students in this sample, (based on IDC clusters alone) do not collectively resemble those students admitted to the "elitest" institutions represented by Antioch, Reed, and Swarthmore; they somewhat resemble students who were admitted to the type of institutional environment and ethos represented by the three church-related (or descended) institutions in Clark's studies.

Certain implications stand out here for counselors and, additionally, for faculty members whose stereotype "image" of community college students may need adjustment.

CHAPTER VI

TREATMENT AND ANALYSIS OF DATA

The major thrust of this research was to determine the efficacy of employing the Omnibus Personality Inventory and the American College Testing program scores in designing a predictive model for identifying entering freshmen students and their propensity to fall into one of three categories of students: successful completers, successful withdrawers, or unsuccessful withdrawers. The factors specifically tested were Thinking Introversion (TI), Theoretical Orientation (TO), Estheticism (Es), Complexity (Co), Autonomy (Au), and Religious Liberalism (RL) from the OPI scales and English, mathematics, social science, and natural science sub-tests plus the composite scores from the ACT battery.

The criteria for appraising "successful vs unsuccessful" student academic achievement were grade point average and units completed. Determining the efficiency of predicting through the use of these variables was to involve the following steps: (1) employing an appropriate predictor technique; for this study both a step-wise multiple regression and multivariate discriminant analysis were employed; (2) determining from the multiple regression and multiple correlation analyses those variables which would be most valuable input in a prediction equation; and (3) defining an appropriate formula which could be used for "identifying" future classes of incoming freshmen to give advanced data to counseling department personnel on the academic potential and needs of students as they enter their first college experience.

Certain research questions underlay the hypotheses which were proposed and tested. The first four of those were noted in the introductory page of Chapter V; two additional questions are these:

5. By utilizing a set of statistical equations, can students who drop out of college be shown to have measurable personality characteristics which differentiate them from students who remain in college?
6. By utilizing a set of statistical equations, can measurable personality characteristics differentiate students who drop out when they are achieving "below average" from students who drop out in "good standing?"

Null hypotheses to be tested were these:

1. There is no distinguishable relationship between the ACT sub-test and composite scores which would show that persisters and non-persisters "score" at measurably different levels.
2. There is no distinguishable relationship between the IDC scales and persistence in college which would show that persisters can be said to score predominantly within categories 1 to 4 of Heist's continuum of intellectual disposition.
3. There is no distinguishable relationship between the IDC scales and the OPI instrument and non-persistence in college which would show that this study's non-persisters scored predominantly within categories 5 to 8 of Heist's continuum, and that below average or failing non-persisters scored predominantly within categories 7 and 8.
4. A step-wise multiple regression statistical analysis of combinations of variables from OPI-IDC and ACT sub-test scores will not contribute to the design of a prediction model of persistence in college.
5. A series of discriminant equations designed by T. W. Anderson and based upon Rao's system of classification will not classify students into three discrete groups of probable academic achievement, when using OPI-IDC data as input.

6. There is no improvement in the significance of a prediction equation utilizing the IDC scales when the ACT sub-tests and composite scores are added to an equation designed to differentiate between persisters and non-persisters.

The remainder of this chapter defines the statistical treatment and analysis of data employing two methodological systems.

Statistical Procedures - I

Step-Wise Multiple Regression Analysis

The step-wise multiple regression procedure is frequently used to determine significant combinations of predictors from a variety of available measurements. The multiple correlation procedure is an improvement over the zero order correlation because it shows the combined relationship of several factors with grade point average and units completed rather than the relationship of one factor at a time with the criteria. Harvey (1969) notes:

> For the general case of linear regression with a dependent variable y and p independent variables, $x_1, x_2, \ldots x_p$, we seek a relationship of the form
>
> $$E_x(y) = B_0 + B_1x_1 + \ldots + B_px_p.$$
>
> That is, the estimated value of y is a function of the sum of products of the series B_1x_1 through B_px_p plus the constant term B_0. The terms B_1 through B_p are computed weightings for the terms x_1 through x_p, and are the partial regression coefficients. In the step-wise method of computation, variables are ordinarily entered only so long as each additional variable makes a significant contribution to the ability of the regression equation to predict the value of y. In most cases a practical limit is about three or four variables. The degrees of freedom within which results may be interpreted are thus a function of the number of variables actually entered into the equation, not the number of variables available to be entered.

Eleven regression equations were computed for each of three populations of students plus one for the entire sample of 1393 students, the independent variables available for selection and entry into the computations being the six OPI scales defined earlier (TI, TO, Es, Co, Au, RL) and five ACT scales (En, Ma, SS, NS, and C).[1] In each case the dependent variable was the population "experience" of the three student groups.

Analysis of the Data

The results of the analyses are reported as regression weights, both in raw and standardized form, and multiple correlation coefficients.

Standardized regression weights are commonly referred to as beta coefficients. Regression coefficients reflect the proportionate weight for each independent variable when the regression equation is used to predict (i.e., explain the variation in) educational potential of pupils. Since independent variables may have widely different scales or ranges, comparison of relative regression weights between variables to determine the degree of prediction for each is facilitated by comparing the standardized or beta coefficients. The algorithm for computing beta weights accounts for scale differences between variables. This is accomplished by a mathematical procedure equivalent to changing the scale for each independent variable to a standardized form;, i.e., each independent variable is so transformed that it has a mean of 0 and a standard deviation of 1. Following this transformation, the beta weights are computed and hence are called "standardized regression coefficients."

---

[1] To facilitate the statistical analysis of these variables, data were assimilated into the 360 Step-Wise Multiple Regression Program from the IBM Contributed Program Library 360D-13.6.001 and processed through an IBM System 370/135. The extent and pattern of inter-relationships of the variables used in the study may be seen by reference to Appendices D-1 to D-12.

The multiple correlation coefficients represents the degree of association between the dependent variable, student population group, and all independent variables combined as a best linear estimate of the dependent variable. The square of this figure yields the coefficient of determination which represents the proportion of variance in the dependent variable explained by the combined independent variables.

Statistical "T" tests are used to determine levels of significance for individual independent variables as predictors of population groupings. It is most important to note that in a step-wise regression procedure, the independent variable having the highest correlation to the dependent variable will be entered first. At the second and succeeding steps, a variable will be entered according to its ability to explain variance in the dependent variable not already explained by independent variables entered earlier. This feature of the step-wise regression procedure allows the identification of the optimum set of predictors for the dependent variable. Emphasis in this procedure is placed on the word set, because entry of a predictor into the regression equation changes the relation of previously entered predictors to the dependent variable. This factor complicates the problem of deciding when to terminate the step-wise analysis. The "T" statistic testing significance of a predictor at step k may exceed the critical value but upon entry of the K+1st variable, it may drop below the critical value. It is therefore necessary for the investigator to employ a measure of wisdom in determining the appropriate step for terminating the step-wise analysis.

At each step in the step-wise regression procedure an F statistic is computed; this tests whether or not the proportion of variance in the dependent variable distribution, which is accounted for by the linear combination of predictors, differs from chance expectation. In this research, this statistic was only accepted as significant at the .05 level or better.

First Analysis: Population I, Successful Completers.

The first analysis of the data used the independent variable TO(Theoretical Orientation), the variable having the highest correlation with the dependent variable (Population I placement). Figure 1 displays the selected values from the computation.

Entry Step	Variable Identif.	Regression Coefficient	Beta Coef.	Good Fit [F test]	Level	"T" Values
Pop I 1	T.O.	0.00	-0.0649			
		Constant Term =	1.001	2.180	Obsv'd	1.476
				3.84	≥ .05	1.6449
		Multiple r =	.065	6.63	≥ .01	2.2414

Observation: The regression coefficient [measuring the degree of relationship between the dependent and independent variable] failed entirely. Both the F test [to establish reliable evidence that the dependent and independent variable are significantly related] and the "T" test [to determine an acceptable level of significance] failed to meet the .05 level. The first variable was thus unable to "explain" any significance of Population I placement.

Figure 1

Because the step-wise regression procedure first calculates the independent variable with the highest correlation to the dependent variable, and because that computation failed to find any significance of correlation, any succeeding steps would be statistically unjustified.

Second Analysis: Population II, Successful Withdrawers.

The first analysis of the data in this calculation used the Esthetic (Es) scale of the OPI as the independent variable with highest correlation with the dependent variable (Population II placement). Figure 2 displays the selected values.

Entry Step	Variable Identif.	Regression Coefficient	Beta Coef.	Good Fit [F test]	Level	"T" Values
Pop II 1	Es	0.00	0.0773			
		Constant Term =	1.997	2.397	Obsv'd	1.548
				3.84	≥ .05	1.6449
		Multiple r =	0.077	6.63	≥ .01	2.2414

Observation: The results of this analysis, like that of Population I, entry step 1, failed to establish any significance.

Figure 2

Again, the regression analysis disproves any acceptable significance between Population II "residence" and the independent variables tested.

Third Analysis: Population III, Unsuccessful Withdrawers.

In analyzing the third group of students the Esthetic (Es) scale was again the independent variable having the highest correlation. Figure 3 displays the values.

Entry Step	Variable Identif.	Regression Coefficient	Beta Coef.	Good Fit [F test]	Level	"T" Values
Pop III 1	Es	0.00	-0.0754			
		Constant Term =	3.002	2.707	Obsv'd	1.645
				3.84	≥ .05	1.6449
		Multiple r =	0.075	6.63	≥ .01	2.2414

Observation: Although the regression coefficient was zero and the F test failed at significant levels, the very slightest margin of possible significance at the .05 level on the "T" test is evidenced and further analysis is called for.

Figure 3

While the F test failed to support any further analysis of the relationships and the probability of causes, the critical ratio or "T" test suggests, by the very slighest margin [Observed value 1.645 vs 1.6449 at the .05 level], that further analysis should be engaged.

The second variable tested was Thinking Introversion (TI). As displayed in Figure 4, the F test was significant at the .05 level and the "T" distribution was significant at both .05 and .01 levels, suggesting that the analysis of the independent variables is appropriate.

Entry Step	Variable Identif.	Regression Coefficient	Beta Coef.	Good Fit [F test]	Level	"T" Values
Pop III 2	TI	0.00	-0.1571			
		Constant Term =	3.004	4.21	Obsv'd	2.75
				3.84	≥ .05	1.6449
		Multiple r =	.132	6.63	≥ .01	2.2414

Observation: The F is significant at the .05 level while the "T" test is acceptable at both .05 and .01 levels. Further analysis is called for despite a Zero order Coefficient.

Figure 4

The third step in the analysis for Population III entered Religious Liberalism as the variable, and the analysis failed to account for any significance on any measure; further, the effect of the third variable on the total of three variables in the analysis to that point was to depreciate the "T" values of the first two. Figure 5 displays the data.

Entry Step	Variable Identif.	Regression Coefficient	Beta Coef.	Good Fit [F test]	Level	"T" Values
Pop III 3	RL	0.00	0.0594			
		Constant Term =	2.999	3.367	Obsv'd	1.2950
				3.84	≥ .05	1.6449
		Multiple r =	.145	6.63	≥ .01	2.2414

Observations: The step-wise regression equation is unable to maintain minimum levels of significance at the third step. No analysis beyond step 2 should be considered.

Figure 5

Implications of Population III Step-Wise Analysis.

Despite the marginal significance of the two highest correlation independent variables, it was useful to determine the degree of variation which was predictable by calculating the square of the multiple correlation coefficient of the last significant step-wise analysis.

(a) In this analysis, whereas the data for the two significant independant variables do suggest "belonging" to group III:

PG = -.0001 (Es) + .0001 (TI) + 3.0004 (Constant) = 3.0006
[Where PG = Predicted group and 3.0006 suggests group 3]

(b) And whereas the calculation of R^2 equals the Coefficient of Prediction: $(0.132)^2 = .017424$.

(c) Therefore less than two percent (2%) of the predicted group variation is predictable and ±98% is purely chance.

Summary: Population I, II, and III Step-Wise Multiple Regression.

Recall that with this statistical technique, the iterative computational procedure identifies with the first iteration the predictor which has the highest correlation with the criterion, and that subsequent iterations add to the predictor set those variations which maximize the R^2 (multiple correlation coefficient). The beta coefficients of the variables measure the relative importance of the variables in predicting the criterion of the group.

Although the iterative sequence was performed with the full model of eleven variables and three distinct student populations, based upon the students who comprise any of three populations in this study and the dimension of "intellectuality" they bring with them, it is not possible—using this statistical process—to type or predict their probable level of persistence.

Analysis of the Total Sample, n=1393.

Because the first three analyses of variables were unable to establish any relationship which could explain group belonging or the variation in the academic potential of the students, a fourth and final analysis was made to determine any indication of association between the total group population and the several independent variables. Figures 6, 7, and 8 and their attendant observations are applicable.

Entry Step	Variable Identif.	Regression Coefficient	Beta Coef.	Good Fit [F test]	Level	"T" Values
Groups 1	ACT-C	-0.0564	-0.3187			
		Constant Term =	3.0688	157.23	Obsv'd	-12.5393
		Multiple r =	0.319	3.84	≧ .05	1.6449
				6.63	≧ .01	2.2414

Observation: The ACT Composite score was the highest correlated independent variable. Despite the small R, both the F and "T" tests exceeded the .01 level and further analysis is appropriate.

Figure 6

Entry Step	Variable Identif.	Regression Coefficient	Beta Coef.	Good Fit [F test]	Level	"T" Values
Groups 2	ACT-SS	-0.431	-0.2433			
		Constant Term =	3.0829	80.9155	Obsv'd	-5.4621
				3.84	≥ .05	1.6449
		Multiple r =	0.323	6.63	≥ .01	2.2414

Observation: The ACT Social Science score was entered next. A strengthened coefficient and significant F and "T" tests at the .01 level are observed.

Figure 7

Entry Step	Variable Identif.	Regression Coefficient	Beta Coef.	Good Fit [F test]	Level	"T" Values
Groups 3	ACT-Ma	-0.0127	-0.0717			
		Constant Term =	3.0604	57.043	Obsv'd	-0.9690
				3.84	≥ .05	1.6449
		Multiple r =	0.331	6.63	≥ .01	2.2414

Observation: A coefficient evidencing almost no relationship between variables and "belonging" to the class of n=1393 occurred when the ACT Mathematics score was added to the analysis. The F test was significant at the .01 level; the critical "T" test failed, however, and further analysis was inappropriate.

Figure 8

Summary.

It became obvious upon studying the results of the full model [to test all the variables against the entire entering class sample] that this analysis would not be useful in designing a predictive equation, given this sample population and the instruments used.

(a) Whereas the data for the two significant variables suggests group relationship:

> PG = -.0431 (ACT/C) -.0134 (ACT/SS) + 3.0829, ± [.799 SEE] [Where PG = predicted group and SEE = Standard Error of Estimate].

thus yielding a group placement between 2.22 and 3.82;

(b) And whereas the calculation of R^2 results in $(0.323)^2$ equals 10.43;

(c) Therefore only ten percent (10%) of the total group "belonging" is predictable, and nearly 90 percent (90%) is pure chance.

Critique of Methodology.

The R^2 prediction method has been used often in attempts to develop predictive criteria or improve prediction accuracy. It is important to note that its failure in this (or any specific) instance does not depreciate its value in another setting or study. College research studies sometimes ignore the fact that the R^2 obtained with any predictor set represents the predictive value of the equation only for the particular sample from which it was derived and the R^2 value may vary with other samples, especially in other settings. The suggestion of making a second attempt to establish a prediction model using the same variables for a different sample of students in the same institutional setting, however, is not encouraged in view of the problems associated with securing and processing the data required for elaborate models (high speed computers notwithstanding), and the fact of the seemingly consistent heterogeneous nature of the students attracted to, and enrolled in the same institutional environment.

Statistical Procedures - II

Multi-variate Analysis

In a second attempt to derive an equation useful in distinguishing between groups of students, multi-variate (multiple correlation) analysis was employed. As another method of analysis used in scientific study when there is interest in examining or predicting the group membership of individuals on the basis of a set of attributes of those individuals, multiple correlation is related both to the intercorrelation among independent variables as well as their correlation within the dependent variable. Cooley (1958) employed the process in studying personality dimensions of engineering students: Prediger applied it (1963) to a study of persistence determination in which SCAT tests and other instruments of personality measures were administered: Rose and Elton employed it when studying certain scales from the OPI and ACT instruments as predictors of vocational choices of college women.

Anderson (1964) proposed multivariate analysis as an appropriate procedure in addressing the ". . .problem of classification (which) may be considered as a problem of 'statistical decision functions'." He cites particularly its appropriateness in student classification:

> Let us give an example of a problem of classification. Prospective students applying for admission into college are given a battery of tests; the vector of scores is a

> set of measurements x. The prospective student may be a member of one population consisting of those students who will successfully complete college training, or rather, have potentialities for successfully completing, or he may be a member of the other population, those who will not complete the college course successfully. The problem is to classify a student applying for admission on the basis of his scores on the entrance examinations.

To accomplish this classification with multiple scores from more than one measuring instrument, Anderson proposed the now-classical procedure first established by Rao to effect classification of individuals into one of several populations.

Calculating the discriminant equation for student classification based upon Anderson's procedures was facilitated by two specialists in statistics and statistical analysis. An IBM System 370 subroutine, available in a programs manual edited by Dixon and Anderson (1964) was programmed and monitored to accommodate input data appropriate to this research by Dr. Laurence Harvey of the De Anza College Data Center in Cupertino. Dr. Barbara Chicks of Sunnyvale evaluated the validity of the output and assisted in interpreting the significance of statistical findings.

The statistical procedure of this analysis had as its purpose the computing of means of the several variables in each group, and the display of a pooled dispersion matrix for all groups, followed by the computation of a set of linear functions which served as indices for classifying individuals into one of several groups. Statistically the operation proceeds as follows.

This routine performs a discriminant analysis by calculating a set of linear functions that serve as indices for classifying an individual into one of K groups.

For all groups combined, the following are obtained.

Common means:

(Steps)

$$\bar{x}_j = \frac{\sum_{k=1}^{g} n_k \bar{x}_{jk}}{\sum_{k=1}^{g} n_k} \qquad (1)$$

[where g = number of groups
j = 1, 2, . . ., m are variables
n_k = sample size in the k^{th} group
$\bar{x}_{jk}$ = mean of j^{th} variable in k^{th} group]

Generalized Mahalanobis D^2 statistics, V:

$$V = \sum_{i=1}^{m} \sum_{j=1}^{m} d_{ij} \sum_{k=1}^{g} n_k (\bar{x}_{ik} - \bar{x}_i)(\bar{x}_{jk} - \bar{x}_j) \qquad (2)$$

[where d_{ij} = the inverse element of the pooled dispersion matrix D].

V can be used as chi-square (under assumption of normality) with m(g-1) degrees of freedom, to test the hypothesis that the mean values are the same in all the g groups for these m variables. For each discriminant function $k_* = 1, 2, \ldots, g$, the following statistics are calculated.

$$C_{ik_*} = \sum_{j=1}^{m} d_{ij} \bar{x}_{jk} \qquad (3)$$

[where i = 1, 2, . . ., m
$k = k_*$]

Constant:

$$C_{ok*} = -1/2 \sum_{j=1}^{m} \sum_{l=1}^{m} d_{jl}\bar{x}_{jk}\bar{x}_{ik} \qquad (4)$$

For each i^{th} case in each k^{th} group, the following calculations are performed.

Discriminant functions:

$$f_{k*} = \sum_{j=1}^{m} C_{jk}x_{ijk} + C_{ok*} \qquad (5)$$

[where $k_* = 1, 2, \ldots, g$]

Probability associated with largest discriminant function:

$$P_L = \frac{1}{\sum_{k_*=1}^{g} e^{(f_{k*} - f_L)}} \qquad (6)$$

where f_L = the value of the largest discriminant function

L = the subscript of the largest discriminant function

The programming flow defined above can be described in the following operational terms.

Step (1) was the computation of the means for each of the tests for each of the 1393 students in each of Populations I, II, and III. This step was conducted one time using six OPI factors, one time using five ACT factors and one time using all eleven factors.

The massive computer-performed pooled dispersion matrix was completed after step (1) each of three times, utilizing all the means data generated by the first step for (a) OPI test data [6 x 6 matrix], (b) ACT test data [5 x 5 matrix], and (c) all eleven tests [11 x 11 matrix].

Step (2) including inversion of the means matrix, operated to determine whether there was any significance of means. Because in each instance there was significant difference, further statistical treatment was warranted.

Steps (3) and (4) were immediate computational steps to calculate and store into computer memory all constants which were input functions of, and which shortened the computational time of step (5).

Step (5) was a major objective of the statistical data analysis, performed three times (one time each for OPI, ACT, and Total data). For each student in each population the functions $F_{1,2. . .g}$ was computed to differentiate classification of each student into one of three groups of "belonging" to either Successful Persister, Successful Non-persister, or Unsuccessful student category.

Step (6), necessarily performed three times, determined the probability that the student did "belong" to the group into which he was cast.

Analysis of the Data.

The critical output of this analysis was Step (5) classification and Step (6), the degree of probability or accuracy of belonging. The following observations are appropriate to the interpretation of statistical significance.

I. Prediction of Placement Based Upon OPI Data.

Table VI-1 displays the data for placement of the 1393 subjects into each of three groups and the probability that the student is there by reason rather than by chance. In interpreting the Table, note that the horizontal "Predicted Group" is that group into which the student is statistically predicted to belong while Obsv'd Pop'n is the population I, II, or III from which the student came as a subject under investigation.

TABLE VI-1

Predicted Group	I		II		III	
Obsv'd Pop'n	n	%	n	%	n	%
I	211	41	155	30	151	29
II	14	4	149	37	238	59
III	120	25	122	26	233	49

Probability of Being in Pop'n		50% n	60% n	70%	80%	90%	-50%
I	I	5					
	II	2					
	III	16	1				493 (95%)
II	I	0					
	II	6					
	III	9	1				385 (96%)
III	I	1					
	II	4					
	III	34	1				435 (92%)

Interpretation:

Applying Anderson's multi-variate analysis classification system to this group of subjects, based on treatment of their OPI intellectual disposition responses, reveals that only forty-one percent of Population I could be predicted into that group of successful students, only thirty-seven percent of Population II could be predicted to belong to that group, and less than half of Population III predicted to be unsuccessful. Population I is otherwise equally distributed by prediction into Population II and III. Nearly sixty percent of Population II students are said to be headed for failure while only four percent of them are predicted as unsuccessful completers. Population III is equally predictable into one of two successful categories after excluding the half who do resemble themselves as unsuccessfuls.

Probability. A brief discussion is important prior to interpreting the second half of Table VI-1. Probability theory is a mathematical subject useful in the study of real-world situations where uncertainty--or chance--plays a role. Chance has some influence on every real-world situation. Consider the frequent illustration of the coin toss: It is common experience that if we toss a coin, we are unable to predict whether it will land "heads" or "tails." While a single coin toss is not deterministic, it is a well-known fact from experience that a certain regularity does appear if we examine the results of a large number of coin tosses and that the probability of a head or a tail is one-in-two, or fifty percent. Another example is evident in the sex of newborn babies. The relative frequency of equal male and female births has been remarkably stable throughout time. The same experience in probability can be extended to chance placement of a given number of college students, at the time they enter, into one of three groups of relative success: By mere chance we could through random assignment "place" students into one of three a-priori groups of persistence with approximately thirty-three percent accuracy.

The lower half of Table VI-1 (page 129) defines the statistical probability that students do, indeed, "belong" in the category which the Anderson model would predict. Note this study's Population I first. If this system of classification had been used when students entered, of all the (211) students predicted to belong to a successful completion group, 206 had less than a fifty percent probability: Yet we know that all 517 of those students did in reality complete (or continue) successfully.

Had this system of classification been applied to Population II students, fifty-nine percent of them would have been predicted unsuccessful and thirty-seven percent would have been confirmed successful withdrawers; yet only 16 of 401 would have been predicted into any population with a fifty percent chance of being there at the end of their college career.

Only 35 of 475 students in Population III, or seven percent, could have been predicted to belong to that group with a fifty percent chance of its occurring; the other ninety-three percent of these students could not be clearly predicted based solely upon the data analyzed in this measurement.

Summary of Prediction Based Upon OPI-IDC Data.

The method employed by Anderson to classify students into one of three groups of academic achievement was statistically unreliable when using the Intellectual Disposition Category scores of the Omnibus Personality Inventory for the student subjects of this sample. Fewer than half of the observed unsuccessful students would have been predicted unsuccessful, sixty percent of those who withdrew in good standing would have been predicted as failures, and fifty-nine percent of those who ultimately completed successfully were predicted not to be completers at all. In investigating by observation the students who could be "predicted to belong" with as little as fifty percent accuracy, this methodology was totally unuseful.

II. Prediction of Placement Based Upon ACT Data.

Table VI-2 displays the data for placement of the 1393 subjects into each of three groups and describes the percentage of probability that they are there by reason rather than by chance.

TABLE VI-2

Predicted Group	I		II		III	
Obsv'd Pop'n	n	%	n	%	n	%
I	225	44	151	29	141	27
II	140	35	137	34	124	31
III	90	19	85	18	300	63

Probability of Being in Pop'n		50% n	60% n	70% n	80% n	90% n	-50%
I	I	20		1			
	II	4					
	III	26	10	8	1		447 (86%)
II	I	16					
	II	1					
	III	27	7	6			345 (86%)
III	I	8					
	II	0					
	III	59	50	33	12	1	320 (67%)

Interpretation:

The results of student responses to the ACT battery provided little basis for accurate prediction by this method with the exception of the eventually unsuccessful group. The degree of relationship between prediction and actual success of Population I is nearly unchanged from that displayed for OPI data, over half predicted not to complete at all and a half of those to be failures. Population II placement by ACT multi-variate analysis is a near-equal distribution into three categories, but—as with OPI data—only one-third of them are predicted into the Population II group in which they all actually fell.

Population III offers a somewhat different dimension from the OPI data. This predictive model would have cast sixty-three percent of the students into an unsuccessful category at the outset of their college experience, and would have identified another eighteen percent as successful but non-completing for a total of eighty-one percent who would be predicted not to complete. Of those students predicted to not be completers, however, only two percent could be predicted with eighty percent accuracy, seven percent with a seventy percent accuracy, ten percent with a sixty percent accuracy, and twelve percent with only a fifty percent probability: Conversely, over sixty-seven percent of the students in Population III predicted not to be successful or completers were so predicted with a less than fifty percent chance of that prognosis occurring.

Summary of Prediction Based Upon ACT Data.

There is another way to analyze the probability of group placement as displayed on Table VI-2. There were 565 of the 1393 subjects, or forty-one percent who were predicted for failure; 373 or twenty-seven percent were predicted to be successful withdrawers; there were 455 for whom successful completion was predictable; these predictions were each broadly distributed across the three groups whose achievement was known. Yet eighty percent of those students were predicted with less than a fifty percent chance that the prediction would hold valid. Since a major thrust of this research was to seek a prediction model for counseling purposes, to intercept students when they begin their college experience and to provide a distinct and specifically individual college-career- and personal counseling tool, the efficacy of relying upon this model—using a reputable and widely accepted measuring instrument—seems not to be supported. Only forty-eight percent of the entire group were predicted correctly; twenty percent were incorrectly predicted to failure, and thirty percent to drop out with academic achievement other than that which they actually realized.

The utilization of Anderson's procedure for this group of students and the instrument employed is not defensible.

III. Prediction of Placement Based Upon Combined OPI and ACT Data.

In a third effort to establish a predictive model the data from both the ACT and the OPI instruments were combined and Anderson's system of analysis applied. Table VI-3 displays results.

TABLE VI-3

Predicted Group	I n	 %	II n	 %	III n	 %
Obsv'd Pop'n						
I	223	43	161	31	133	26
II	127	32	155	39	119	30
III	95	20	87	18	293	62

Probability of Being in Pop'n		50% n	60% n	70% n	80% n	90% n	-50%
I	I	49	4				
	II	27	1				
	III	19	12	12	1		350 (70%)
II	I	31					
	II	27					
	III	28	8	3	1		303 (76%)
III	I	21					
	II	12					
	III	64	57	31	15	1	274 (58%)

Interpretation:

There was little improvement over the use of ACT data alone in determining placement by multi-variate analysis. The percentage of students predicted into Population I, II, or III from each of the three groups did not vary more than one or two percent from the ACT model except in the case of the Population II group which experienced a five percent increase in prediction that they would "look like themselves" using ACT and OPI in concert.

There was some reduction in the incidence of chance when compared with the incidence in the ACT model, but only fifteen percent, ten percent and nine percent reduction respectively for the three groups. Further, "chance" was still the overwhelming determinant and--at the fifty percent level--it magnified the error of placement into two incorrect groups and did not improve the probability of correct placement into the known-observed academic success level.

Summary of Prediction by Combining ACT and OPI Data.

There appears to be no accurate, safe, and explicit interaction within or between the independent variables represented by the scores achieved on ACT and OPI instruments by students in the study when combined in a multi-variate analysis utilizing Anderson's model for statistical decision making while addressing the problem of classification. It appears that a wide variety of relatively enduring personality characteristics, combined with indicators of probable scholastic ability, do not distinguish between unsuccessful students who withdraw from college and successful students who withdraw or who continue to "complete" a program of studies.

Particularly, those students who withdrew in good standing are indistinguishable from those who continue in good standing and complete studies.

CHAPTER VII

TESTING THE HYPOTHESES

The purpose of this study was to design a procedure whereby entering college students' responses to OPI and ACT scales could be statistically treated so as to distinguish between those students who are more likely to "complete" a program and those who exhibit a propensity to become either successful withdrawals or unsuccessful withdrawals.

Two assumptions underlay the design of the study:

1. Grade Point Average (GPA) and units completed represent a contemporary measure of academic achievement.
2. Subsequent entering Freshman class members will possess basic characteristics comparable to those of the study group and a model for prediction is potentially useful.

Six research questions underlay the hypotheses tested in anticipation of developing a predictor model:

1. To what extent does the American College Testing Service (ACT) instrument discriminate between those students who remain in college and those who withdraw?
2. To what extent does the Omnibus Personality Inventory (OPI) Intellectual Disposition Category (IDC) system discriminate between those students who remain in college and those who drop out of college?
3. Is there a relationship between "successful" and "unsuccessful" dropouts and the IDC criteria of the OPI?
4. Can the Composite and sub-test scores of the American College Testing Service (ACT) battery combine with the IDC scales of the OPI to increase the differentiation between persisters and dropouts?

5. By utilizing a set of statistical equations, can students who drop out of college be shown to have measurable personality characteristics which differentiate them from students who remain in college?

6. By utilizing a set of statistical equations, can measurable personality characteristics differentiate students who drop out when they are achieving "below average" from students who drop out in "good standing"?

At the outset of this research, six hypotheses were stated in the null form. Their support or rejection is explored and elaborated upon in the remaining portion of this chapter.

FIRST HYPOTHESIS.

> There is no distinguishable relationship between the ACT sub-test and composite scores which would show that persisters and non-persisters "score" at measurably different levels.

Based upon several data measurement comparisons [displayed and discussed in Chapter V], *the first hypothesis is rejected.*

Two groups in this study—the successful persisters and successful non-persisters—each scored above the 69th percentile of national norms for two-year college entrants on all tests except one for the first group; that one exception was above the 59th percentile. Further, the successful persisters scored at or above the 69th percentile on two of four ACT sub-tests plus the composite.

The unsuccessful group scored in percentiles of 37, 43, 46, 43, and 43 (rounded) respectively on the sub-test/composite scales, or from 22 percent to 27 percent lower than successful persisters and 18 percent to 24 percent lower than successful non-persisters.

Given an ACT Instrument Standard Error of Measurement Distortion of the standard score (see Chapter V narrative), data in Table V-3 are clearly illustrative of the differences in ACT percentile "range" for the successful students—both the completers and the withdrawers—compared with the unsuccessful students. While the Standard Error of Measurement interpolation would indicate the successful Populations I and II students scoring above the 50th percentile, at worst, in all but one test (English at 42.6 and 44.2) their potential upper-limit range was between the 75th and 80th percentile for completers and 72 to 79 percent for successful withdrawers. By contrast, the unsuccessful students in this study had a potential percentile range from a low of 24 percent to a high of 58 percent.

The unsuccessful group performance on any single measure—standard score, percentile rank, or percentile range—was clearly lower than either of the two successful groups of their classmates.

SECOND HYPOTHESIS.

> There is no distinguishable relationship between the IDC scales and persistence in college which would show that persisters can be said to score predominantly within categories 1 to 4 of Heist's continuum of intellectual disposition.

This hypothesis is supported. Fewer than 30 percent of the persisters, [or either of the other groups] are accounted for within the first-to-fourth intellectual disposition category. Confirmation of this analysis is facilitated by the display of Table V-8, repeated here. Table VII-1 (page 142) rearranges the data in terms of the second hypothesis.

TABLE V-8 (REVIEWED)

CATEGORIES 1 - 8 INDIVIDUALLY

	Pop I		%*	Pop II		%	Pop III		%	Total Group	
IDC	No.	%	G	No.	%	G	No.	%	G	No.	%
1	6	1.16	.4	5	1.25	.4	5	1.05	.4	16	1.15
2	22	4.26	1.6	22	5.48	1.6	20	4.21	1.4	64	4.59
3	41	7.93	2.9	28	6.98	2.0	19	4.00	1.4	88	6.32
4	85	16.44	6.1	60	14.96	4.3	59	12.42	4.2	204	14.64
5	96	18.57	6.9	69	17.21	5.0	65	13.68	4.6	230	16.51
6	209	40.43	15.0	165	41.15	11.8	239	50.32	17.2	613	44.01
7	53	10.25	3.8	39	9.73	2.8	49	10.32	2.5	141	10.12
8	5	.96	.4	13	3.24	.9	19	4.00	1.4	37	2.66
Totals	517	100%	37.1	401	100%	28.8	475	100%	34.1	1393	100%

* %G = Percent of total group of n=1393.

TABLE VII-1

CATEGORIES 1-4, 5-6, 7-8 PER HYPOTHESES

	Pop I		%*	Pop II		%	Pop III		%	Total Group	
IDC	No.	%	G	No.	%	G	No.	%	G	No.	%
1-4	154	29.79	11.	115	28.68	8.	103	21.68	7.	372	26.70
5-6	305	58.99	22.	234	58.35	17.	304	64.00	22.	843	60.52
7-8	58	11.22	4.	52	12.97	4.	68	14.32	5.	178	12.78
Totals	517	100%	37.	401	100%	29.	475	100%	34.	1393	100%

* %G = Percent of total group of n=1393.

THIRD HYPOTHESIS.

> There is no distinguishable relationship between the IDC scales of the OPI instrument and non-persistence in college which would show that this study's non-persisters scored predominantly within categories 5 to 8 of Heist's continuum, and that below average or failing non-persisters scored predominantly within categories 7 and 8.

This hypothesis is supported in part. Unsuccessful persisters did, indeed, score within IDC categories 5 to 8: But so, too, did the persisters. The three groups of successful persisters, successful non-persisters, and unsuccessful students had 71 percent, 71 percent, and 78 percent of their numbers respectively in IDC range 5 to 8. In this measure of academic potential, then, non-persisters are not unlike persisters who completed two-year degree-equivalent study.

The below-average and failing non-persisters did not score predominantly within categories 7 and 8 [as recounted in Table VII-1 above]; and there is almost no differential between three group percentages clustered in the lower categories.

OPI Manual authors Heist and Yonge (1962) note that "The people in IDC 5 can probably best be defined as 'neutral' on this measured disposition toward intellectual involvement. . ." as opposed to the term "intellectual" or any direct contradictory term of description. They are likely students who are motivated but who pursue learning as a ". . .means to an end and seldom for the intrinsic satisfactions gained from the acquisition of knowledge or the process of inquiry." Students in categories 7 or 8 are ". . .less committed to all that is represented or implied by the term intellectual interests," are not typified by any of the positive aspects which define students in the first six categories and, although they may frequently have high aptitudes for the abstract or theoretical, their only interest is in a very pragmatic and nonconceptual application.

Given the percentages of students in this study who clustered into the eight IDC categories and the Third Hypothesis clustering (Table VII-1), we conclude that these students are very much alike in terms of the dimension of their intellectual interests and application, and they tend to cluster into a range which portends limited and restricted orientation to the area of cognitive learning. To have used this gross data, given the size of groups represented by Populations I, II, and III, to derive a predictive decision about their persistence in the academic environment would have been inappropriate and inaccurate.

FOURTH HYPOTHESIS.

> A step-wise multiple regression statistical analysis of combinations of variables from OPI-IDC and ACT sub-test scores will not contribute to the design of a prediction model of persistence in college.

The hypothesis is supported. An extensive computer-assisted step-wise regression analysis described in detail in Chapter VI was engaged for each of three populations of students plus the combined sample of all students. In an iterative computational procedure utilizing eleven OPI and ACT variables in the order of highest correlation in predicting belonging to a group, no significance whatever could be evidenced in either of the two groups of students identified as successful persisters and successful withdrawers. Only the slightest significance of the two highest correlates for the unsuccessful student group was detected and the statistical predictive accuracy-of-belonging of those two was less than two percent.

Upon treating all variables for all students in the entire study group it became obvious that it would not be possible to design a mathematical predictive equation for any one, or combination of, student groups.

In this effort, a step-wise multiple regression analysis of combinations of variables did not contribute to predictive model building.

FIFTH HYPOTHESIS.

> A series of discriminant equations designed by T. W. Anderson and based upon Rao's system of classification will not classify students into three discrete groups of probable academic achievement, when using OPI-IDC data as input.

SIXTH HYPOTHESIS.

> There is no improvement in the significance of a prediction equation utilizing the IDC scales when the ACT sub-tests and composite scores are added to an equation designed to differentiate between persisters and non-persisters.

This research supports both hypotheses. Despite the reported success of Anderson and other researchers in classifying students by this statistical process, its application to this sampling of students--given their responses to the instruments administered--was not productive.

A massive computer analysis was engaged and repeated for each group of students utilizing OPI input data first (Hypothesis 5), separate ACT data next, and the combined OPI and ACT data (Hypothesis 6) in a third analysis. All analyses were statistically indefensible as contributing to an accurate predictive model.

The highest order of predictive placement occurred when the OPI and ACT variables were combined. In that analysis, only forty-three percent, thirty-nine percent, and sixty-two percent of Populations I, II, and III were correctly "placed" and the probability of the accuracy of these group placements was less than fifty percent for over seventy percent of two sample populations and sixty percent for the third.

It is concluded that no interaction of variables existed within these analyses to contribute to an accurate system of decision making in classifying students by a propensity to persist in college.

Summary of Null Hypotheses Tested.

1. There is no distinguishable relationship between the ACT sub-test and composite scores which would show that persisters and non-persisters "score" at measurably different levels.

   The hypothesis is *rejected*.

2. There is no distinguishable relationship between the IDC scales and persistence in college which would show that persisters can be said to score predominantly within categories 1 to 4 of Heist's continuum of intellectual disposition.

   The hypothesis is *supported*.

3. There is no distinguishable relationship between the IDC scales and the OPI instrument and non-persistence in college which would show that this study's non-persisters scored predominantly within categories 5 to 8 of Heist's continuum, and that below average or failing non-persisters scored predominantly within categories 7 and 8.

   The first assumption is *supported*, the second assumption is *rejected*.

4. A step-wise multiple regression statistical analysis of combinations of variables from OPI-IDC and ACT sub-test scores will not contribute to the design of a prediction model of persistence in college.

   The hypothesis is *supported*.

5. A series of discriminant equations designed by T. W. Anderson and based upon Rao's system of classification will not classify students into three discrete groups of probable academic achievement, when using OPI-IDC data as input.

   The hypothesis is *supported*.

6. There is no improvement in the significance of a prediction equation utilizing the IDC scales when the ACT sub-tests and composite scores are added to an equation designed to differentiate between persisters and non-persisters.

   The hypothesis is *supported*.

CHAPTER VIII

CONCLUSIONS AND RECOMMENDATIONS

Much research on collegiate persistence has been conducted since Fishman (1959) expressed the opinion that educators need to consider the importance of non-intellective characteristics as they affect the student at ". . .the very core of the college experience and the very heart of a college's responsibilities. . . (and). . .which must remain contingencies when considered from the point of view of prediction. . . ."

In 1960 Knoell noted that the bulk of research in that area had too seldom used a psychological approach, e.g., studying student personality characteristics and the effect they may have on student persistence and withdrawal.

In 1967 Trent and Medsker, in a landmark study, reemphasized the need to consider the importance of a variety of factors which influence student performance and achievement in the college environment. These researchers noted:

> The successful completion of college depends upon a certain minimum of academic aptitude. But that is not enough. It is our position that the particular pattern of college attendance pursued by the individual greatly depends on factors beyond ability--the values he ascribes to college as well as to related attitudes and goals.

Much of the reported study of non-intellective characteristics in the past decade has concentrated on student populations of small-n, often homogenous, and most often from four-year, selective-admission-institutions. The focus of this study was on a first-time entering freshmen group of two-year community college students enrolled into a variety of academic study disciplines, and on a cross-section of students who were not uniquely different from other entering freshmen classes based upon several comparisons (Chapter III) with other entering classes.

The central purpose of the study was to design a predictive model which would help identify in advance entering freshmen students who might (1) successfully complete the equivalent of a college degree-granting program (2) withdraw from the college in good standing but before reaching the degree-equivalent level of accomplishment, or (3) withdraw from college with an academic record which was below average or failing. Building on the position advocated by Fishman, Knoell, Trent, and Medsker and many other researchers, that non-intellective factors are determinants in academic achievement and academic persistence, the present study utilized a set of measurements from the Omnibus Personality Inventory, supplemented by measures from the American College Testing Program battery, and employed two different statistical methods as an aid in building a model for predictive decision making.

The remaining comments and summary statements represent the conclusions and recommendations of the study.

A Profile of the Subjects.

Of the entering community college class of 1393 students who were legitimate, first-time entering, day college students, 517 (37.11 percent) completed the equivalent of an Associate in Arts degree [31 were still enrolled in good standing] after five academic years. Four hundred and one students (28.79 percent) withdrew from the college with good academic records but without achieving the equivalent of an A.A. degree in the five-year period. The remaining 475 students (34.1 percent) withdrew with grades below average, the preponderance having received mostly failing grades.

The students who were ultimately unsuccessful at the college failed dramatically to complete their units attempted during the first term of enrollment. The students successfully completing their programs experienced modest reduction in units attempted during their first term and successful withdrawers experienced the least drop in units attempted/completed.

For the total study group, the units completed divided almost equally into thirds: One-third failed to complete one year equivalency successfully, another near-third completed one year but less than two, and the final third completed the equivalent of two years or more.

A striking observation of grade point achievement by three populations of this study was the consistent similarity between the two successful groups which belies some common and often unfounded conclusions about college "drop-outs." Students who withdrew successfully earned grades commonly expected of degree-seeking students and measurably higher than the grades of those students in the sample who did complete degree requirement equivalents. But it should be more significant to this college's counseling/guidance staff that evidence from this study suggests students who make poor beginning records in this college tend to continue at a low achievement level. Sixty-three percent of all students who were on probationary status the first term were from the group of eventually unsuccessful students; none among this sixty-three percent received any grade above "C" level achievement, and they represented only twelve percent of all the students who received grades within the "C" range.

Recommendation: At a time when individualized instruction, learning skills centers, remediation programs, and tutorial centers have come into prominence within divisions and departments of the college, an early warning identification program should be initiated by the student personnel office to spot students who may be in need of immediate educational counseling and reevaluation and immersion into one or more special programs. Criteria for determining students needing such counsel include at least (a) slippage between units attempted and completed, (b) grade point averages achieved in relation to nature of courses and intellectual skills required, and (c) evidence from high school performance record and patterns which coincides with first-term college achievement. The "price" of not engaging in such a program is too great; further, continuing the present practice admits to offering an educational program with a measurement process having no internal quality assurance.

Statistical Methodology:

Conclusion. Given the nature of the sample population tested, the variables derived from the Omnibus Personality Inventory and the variables derived from the American College Testing Program battery, neither the step-wise multiple regression analysis nor the multivariate analysis contributed to designing a statistical model for predictive placement of college students. Academic performance and persistence of the three groups is not accounted for by the test score differences utilized in this study. No one variable or combination of variables employed accounted for academic persistence.

Discussion. As an empirical approach to classification decision making, two diverse statistical techniques were employed; a step-wise multiple regression analysis and a multivariate analysis of data. Each is highly sensitive, highly sophisticated and statistically powerful; each has been used on many occasions in similar research or quantitative analysis. In this study both procedures failed to yield a statistically valid equation for prediction model building. While there were significant individual variables with positive correlations in a few instances, in composite formulation there was no reliability of their relationship to achievement-measure variables which determined group classification.

As suggested earlier, the failure of the procedures to develop or improve prediction accuracy in this instance does not negate their value in other studies, e.g., the area of collegiate environment. Their use in this institution, given the general nature of the student populations, is not encouraged. If the focus of future analysis were to again be on gross numbers and large clusters of students, a replication study would likely not prove to be a valuable use of institutional time and facilities.

It is believed, however, knowing the particular nature of this college's students, the socio-economic community from which they came, the academic environment, and the institutional press of the college, that other ways of predicting academic performance and permanence could be attempted, and that a wider variety of personal characteristics, combined with other indicators of scholastic ability, must be investigated to differentiate among students.

Recommendation. The value of making a second attempt to establish a predictive model using the same variables for a different large and diverse sample of students from the same institutional setting is not recommended. If any further experimentation of this nature is attempted it should be limited to studying students in narrow and clearly defined major fields of study (engineering, nursing, accounting, etc.); other institutional research (Chapter III) has realized some degree of success in building profiles of students who succeed or do not succeed in discrete career preparation programs. Any such effort should expand the number and kind of variables such as including a broader use of characteristics measures from the OPI, the high school grade point average, and, perhaps, the rank in high school class. Because many performance studies have shown that the best single predictor of college achievement (grade point average and units completed) is the high school G.P.A. and percentile rank of student-to-class, this variable should be considered as an essential input factor of any further research into predictive model building.

The Omnibus Personality Inventory.

Discussion. One objective of the study was to determine whether students who withdrew from this college could be shown to have some measurable personality characteristics which differentiate them from students who remained in college. It was also of interest to attempt to detect differences between those students who withdrew with academic achievement records considered to be successful and those whose grades were barely passing or failing upon leaving.

The analysis of data from the IDC scales of the Omnibus Personality Inventory provided little basis for any meaningful response to these questions. The mean score profiles on the IDC's (Table V-4 to V-7) and the ranges of IDC scores, either score-by-score or in the totality of the IDC measure, led to no significant distinguishing differences among the three groups, and the comparison of any two populations did not reveal any significant pattern.

Our conclusion is that the answer to such comparisons will not come simply by the study of gross data from large diverse samples of students. Rather, the value of the OPI rests in the analysis of individual student responses and the opportunities which one-to-one counselor/student interface relations offer. It is highly probable that the personal factors and forces leading to the withdrawal of the "successful" student are substantially different from those of the student who withdraws with a poor academic record, but the variety of psychological and personality characteristics which are combined in the instruments used to assess a syndrome of intellectual interest and academic achievement do not appear to clearly distinguish between successful or unsuccessful students with measurable consistence.

Recommendation. Any continued use of the Omnibus Personality Inventory by the college is conceived to be most valuable and useful in a one-to-one and small group interaction counseling/advising mode. Use of this inventory should be left to those most competent to administer and evaluate it, and then only in a manner which clearly identifies the values of the instrument as it measures an individual student's responses. It seems important to underscore this caution with the following extract from McConnell and Heist's essay in The American College (1961).

> All too little is known statistically or experimentally about the relationship between the personality characteristics students bring to college and their academic achievement, either in the conventional sense of grades and persistence, or in the more subtle sense of independent, critical, and creative intellectual competence which is seldom reflected in academic marks. . . .but the first step in making these studies is to know the entering student, to know him as a person and to see him against his background and against the college environment and its sub-cultures.

The American College Testing Program battery.

Discussion. Several pages which display and discuss findings based on student response to the ACT instrument comprise a portion of Chapter V. A brief summary and conclusion is important at this point.

The mean scores achieved on the ACT battery by the three groups of students in the study were compared with three normative sample groups (Chapter V). These three comparison groups were (1) one million college-bound seniors from 1962-65; (2) forty thousand freshmen students who entered 106 two-year colleges in 1963-65; and (3) forty thousand freshman students who entered 125 four-year colleges during the same years.

Within this study's three groups a clear difference in mean score distributions is observable. Students defined as successful completers excelled the scores of students in all three normative sample groups on all five scales with two very slight exceptions; the study's successful non-completers excelled on ten of fifteen possible comparisons, achieved the same score on two others and fell slightly below on three. Each of these groups of students, however, excelled on all comparisons with the entrants into the other two-year colleges and on all but one comparison with four-year entrants. By contrast, the unsuccessful non-completing students in this study fell one-standard-score below all other two-year entrants, two to three standard scores lower than all four-year entrants, and three or more scores below all college-bound youth.

Based on "potential percentile range" (Chapter V), the unsuccessful population of students ranged from twenty-four percent to fifty-eight percent, whereas the successful students--both completing and not completing--ranged from the fifty-first to eightieth percentile on four of five measures.

Conclusion. ACT scores clearly establish valuable, albeit limited, early information about student potential for college performance and achievement. Normative comparisons are important in pre-admission counseling of college entrants, and the establishment of institutional norms, based on performance of prior student groups, is a potentially valuable tool.

Recommendation. The college should continue to utilize the ACT battery as a valid and useful counseling and placement tool. Further, the initiation of an early warning identification program for following and guiding student achievement in the college should include the ACT battery results as a weighted input factor and an advising guide in the preregistration program. An easily designed and monitored, computer-assisted data assembly procedure could and should be initiated to gather institutional normative sample information for the purpose of improving counseling services to subsequent incoming students.

Successful Students Who Withdrew.

Discussion. Why the students in good standing withdrew from this collegiate environment is not answered by any part of this investigation. There appear to be no implications within the total information collected on these students which might be legitimately highlighted to explain or defend early student termination. It is presumed that many of these achieving withdrawals take up their continuing education in other institutions, although the absence of exit-interview processes and of adequate follow-up studies for this group thwarts displaying supportive data for such an assumption.

In terms of the OPI results, this group of successful students seem indistinguishable from either their degree-equivalent classmates or national normative sample students. While it can be observed that ACT scores relate positively to the successful completing student group, the numerical relationship would be difficult to use predictively in distinguishing between those who successfully continued and those who withdrew in good standing. The latter group's ACT scores rank above national norms for comparable entering students and are little different from those of the successful completers in this study.

The academic performance during residence of all successful students is relatively similar. Each group established almost identical grade point average patterns; their distribution into "honors" and "good standing" categories was similar; the percentage of students on probation in proportion to the number continuously enrolled was fairly equivalent; and the successful non-completers achieved the better records of completion of units attempted while enrolled.

Conclusion. We are led to concur with other researchers and writers that a complex assembly of variables comes into play, distinct from those which may account for responses to the ACT or OPI instruments; until the time comes that more specific and appropriate variables can be established, we must rely upon other traditional measures of anticipating college academic performance. Personality characteristics, especially are not necessarily criteria of success or failure in college and ought not become criteria for admission, placement, or "tracking" of entering collegiate students.

Students Who Withdraw.

Discussion. It is appropriate to link some reasons for dropping out or stopping out to the need for more realism in the educational objectives of the institution. More flexible curricular and educational opportunities must exist for all students, particularly for students who may become (either successful or unsuccessful) withdrawing students. There is need for greater emphasis on open-entry/open-exit courses which can operate outside the traditional, lock-step calendar of beginning and ending dates, thus affording students the luxury of entering when ready to engage the course, proceeding at a pace more suitable to their ability and expenditure of effort, and receiving the credit earned upon completion of clearly defined, measurable, educational performance objectives.

Surely, creative and innovative faculty could also organize some courses around open-entry/open-exit *hours* of instruction within a course calendar: In courses where specified sets and combinations of facts, concepts, skills, and understandings are essential for future application of course work, it may be desirable for students with varying degrees of academic ability to vary the number of hours per week they attend class as they more through the instructional patterns and demands. Competent advising and simple class schedule notations can facilitate the needs of diverse audiences of students who, if like those identified in this study as possessing normative scores on the ACT instrument and personality characteristics not unlike thousands of other college students as measured by the OPI, could profit from college if different styles for educational opportunities were available.

Opportunities for educational expansion through field experience education, often called cooperative education, work-learn programs, or internships, provide another dimension of individualizing education for students who find the traditional academic environment sterile or stilted.

Educational institutions presumably exist, after all, to respond to the learning needs of the society and its citizens. Learning is designed to prepare a person not solely for the discovery of knowledge, but for living. It is a process to facilitate intellectual and personal growth, to develop one's capacity for good judgment and personal responsibility, and to initiate a lifelong interest in personal expansion and flexibility to adapt to changing needs.

The recommendation is for more substance than form in providing diversity of educational and curricular opportunity to attempt to alter what has become the norm of the majority of students who enroll into this college—withdrawing without establishing any discernible pattern of having "packaged" a meaningful educational achievement, perhaps because of a lack of alternatives.

General Conclusion

The purpose of this post-facto descriptive, hypothetically predictive study was to compare three groups of college students on certain selected characteristics, as measured by the American College Test Program assessment of general academic ability and the Omnibus Personality Inventory assessment of a syndrome of intellectuality.

It was anticipated that certain questions could be answered by the data gathered on nearly 1400 students; questions such as "What are the variables which account for the differences in academic persistence of the students observed?", and "Is an inventory of enduring non-intellectual characteristics a valuable measure of a college student's propensity to persist in an academic program of studies?", and other questions. A considerable body of data about the students was collected and analyzed.

The results of the study did not contribute to answering the questions. The results suggested—given the students and the institutional environment studied—that the variety of ability and personality characteristics studied did not distinguish among the students who were categorized as successful completers, successful withdrawals and unsuccessful withdrawals, when the variation in the academic performance of the groups was controlled.

The study does not by any means exhaust the variety of personal characteristics and attributes which students possess which may be measured to differentiate between students who persist and those who do not persist in college. The results obtained here, however, create generally conclusive evidence that the approach and the methodology employed should not be replicated, at least as far as attempting to predict academic success—success as generally defined by academicians.

Approximatley seventy percent of the high school graduates in the State of California begin some type of post-secondary higher education; vast numbers of them never complete the first year, and many not even the first term. Further, the current demand upon the colleges—and particularly the two-year community college—is to serve new audiences of students, young and old. The society has changed, even since the day the students in this study entered their first collegiate experience, and with those changes has come a call for new and divergent educational direction and dimension. The citizens of the state and the nation invest vast resources in the colleges, individually and collectively. If the colleges and universities are to be genuinely responsive to the many and diverse needs of a pluralistic society, they must reexamine their ability to serve their clientele in terms more closely aligned to the personal needs and potential of the students who comprise their academic community.

Despite the failure of the research to provide the answers sought, or a predictive model based on one group of students which might be transposed to predict the events in the lives of a subsequent group of students, the researcher continues to subscribe to an original thesis enunciated in the opening chapter. We still believe that this is a time when college students are being increasingly handled in masses on most college campuses and that college faculty, counselors, administrators, and staff need to learn more about them as individuals seeking useful educational experiences. An accurate "profile" of entering students is an important first step in understanding students, in assisting them to plan appropriate educational objectives, and in designing institutional goals and objectives. We propose this deserves the highest priority of institutional effort.

The results of the study have been far less revealing than anticipated. Yet if the study stimulates further consideration of, and response to, any one of the findings or recommendations, and if it results in improving the educational opportunities of college students, the time and effort expended have been well dedicated.

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APPENDIX A-1

CHARACTERISTICS OR VARIABLES ON WHICH 1965 FRESHMEN population can be compared by studies conducted independently by Nereson and by Davidson

[Data included in Davidson study noted by asterisk.*]

I. College abilities as measured by the ACT*
  1. English
  2. Mathmematics
  3. Social Science
  4. Science
  5. Composite

II. Achievement, as measured by high school grades
  6. High school grade point average*
  7. High school English
  8. High school Mathematics
  9. High school Social Science
  10. High school Science

III. Attitudes, as measured by the Omnibus Personality Inventory*
  11. Thinking Introversion (TI)
  12. Theoretical Orientation (TO)
  13. Estheticism (Es)
  14. Complexity (Co)
  15. Autonomy (Au)
  16. Religious Liberalism (RL)
  17. Impulse Expression (IE)
  18. Social Alienation (SA)
  19. Social Introversion (SI)
  20. Lack of Anxiety (LA)
  21. Masculinity-Femininity (MF)
  22. Response Bias (RB)

IV. Biographical-Sociological factors, as measured by an inventory(ACT)
  23. College Goals*
  24. Decision-making - college attendance
  25. Decision-making - college major or vocational field
  26. Family influence
  27. Student evaluation of high school experience
  28. Participation in student activities

V. Interests, as measured by the Strong Vocational Interest Test

VI. Persistence--Comparison of the following Groups*
  29. Less than One Semester
  30. One Semester
  31. Two Semesters
  32. Three Semesters
  33. Four Semesters
  34. More than Four Semesters

VII. Major Objective*
  35. Transfer Students
  36. Terminal Students
  37. Neither Transfer nor Terminar

APPENDIX B-1

STUDY OF 1393 FRESHMEN WHO ENTERED FOOTHILL COLLEGE IN THE FALL OF 1965

Data Input

There are three key punched cards for each of 1400 students. The cards and the data for each are as follows:

1. Academic Card

Column	Information
1- 9	Social Security Number
10-27	Name
28-30	Units attempted Fall 1965
31-33	Units completed Fall 1965
34	Card Index
35-36	Blank
37-39	Grade Point Average
40	Academic Status
	0 Good Standing
	1 Probation
	2 Honor Student
	3 Disqualified
41-43	Units Attempted Cumulative
44-46	Units Completed Cumulative
47-48	Blank
49	Population Index
50	Blank
51-53	Grade Point Average
54	Academic Status
	0 Good Standing
	1 Probation
	2 Honor Student
	3 Disqualified
55	Terms attended 1 through 0; 0 includes 10 or more
56	Terms on probation 1 through 0
57	Terms disqualified 1 through 0
58	First term reentered; students not fitting the code were entered in column 59
	1 - Fall 66
	2 - Spring 67
	3 - Summer 67
	4 - Fall 67
	5 - Spring 68
	6 - see list
	7 - Spring 66
	8 - Summer 66
	9 - Summer 69
	0 - Fall 68
59	Term of second reentry; some students, this is the first reentry
	1 - Fall 68
	2 - Winter 69
	3 - Spring 69
	4 - Summer 69
	5 - Fall 69
	6 - Winter 70
	7 - Spring 70
	8 - Fall 67
	9 - Spring 68
	0 - Spring 67

Column — Information

60-61 Withdrawals - 1st time
01 - Fall 65, during term
02 - Fall 65, end of term
03 - Spring 66, during term
04 - Spring 66, end of term
05 - Fall 66
06 - Spring 67
07 - Fall 67
08 - Spring 68
09 - Fall 68
10 - Winter 69
11 - Spring 69
12 - Fall 69
13 - Winter 70
14 - Spring 70
15 - Summer 66
16 - Summer 67
17 - Summer 68
18 - Summer 69
19 -
20

62 Graduates
1 - Spring 67
2 - Spring 68
3 - Spring 69
4 - Spring 70

63 Number of Reentries: 1 through 0; 0 - no reentries

64 3rd Reentry
1 - Fall 68
2 - Winter 69
3 - Spring 69
4 - Summer 69
5 - Fall 69
6 - Winter 70
7 - Spring 70
8 - Fall 67
9 - Spring 68
0 - Spring 67

65 4th Reentry
1 - Fall 68
2 - Winter 69
3 - Spring 69
4 - Summer 69
5 - Fall 69
6 - Winter 70
7 - Spring 70
8 - Fall 67
9 - Spring 68
0 - Spring 67

66-67 2nd Withdrawal
01 - Fall 65
02 - Fall 65
03 - Spring 66
04 - Spring 66
05 - Fall 66
06 - Spring 67
07 - Fall 67
08 - Spring 68
09 - Fall 68
10 - Winter 69
11 - Spring 69
12 - Fall 69
13 - Winter 70
14 - Spring 70
15 - Summer 66
16 - Summer 67
17 - Summer 68
18 - Summer 69
19 -
20 -

68-69 3rd Withdrawal
01 - Fall 65
02 - Fall 65
03 - Spring 66
04 - Spring 66
05 - Fall 66
06 - Spring 67
07 - Fall 67
08 - Spring 68
09 - Fall 68
10 - Winter 69
11 - Spring 69
12 - Fall 69
13 - Winter 70
14 - Spring 70
15 - Summer 66
16 - Summer 67
17 - Summer 68
18 - Summer 69
19 -
20 -

Column	Information
70	Continuers-Students enrolled in Spring 70; May or may not continue to enroll. Indicated by "1"
71	Number of times students withdraw: 1 through 0 "9" includes 10 or more times

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Transfer Information

72-73	College to which student transferred, see code
75	Term when transfer was made, see code
76-78	Units completed. If less than 100, use columns 76 & 77; 500 indicates Bachelor's Degree
79-80	Grade point average (GPA)

2. ACT Data (Scores) CARD

Column	Information
1- 9	Social Security Number
10-27	Name
28-33	Blank
34	Card Index
35-48	Blank
49	Population Index
50-51	English
54-56	Math
58-59	Social Science
62-63	Science
66-67	Composite
68-80	Blank

3. Omnibus Personality Iventory (OPI) Data (Scores) CARD

Column	Information
1- 9	Social Security Number
10-27	Name
28-33	Blank
34	Card Index
35-36	Factor 1 (Score)
39-40	Factor 2
43-44	Factor 3
47-48	Factor 4
49	Population Index
51-52	Factor 5
55-56	Factor 6
59-60	Factor 7
63-64	Factor 8
67-68	Factor 9
71-72	Factor 10
75-76	Factor 11
79-80	Factor 12

APPENDIX C-1

INTELLECTUAL DISPOSITION*

Identification and Classification (in standard scores)**

Category	Primary Criteria (TI, TO, Es, Co)	Secondary Criteria
1	Pattern on first four scales (TI, TO, Es and Co) averages 65 or above with either TI or TO at 70 or above and the other above 60. (When either TI or TO below 60, S falls in Category 2.)	Au and/or RL above 60. (When both Au and Rl below 60, S falls in Category 2.)
2	Pattern average on first four scales ranges from 62 to 64 with either TI or TO at 65 or above and the other above 55. (When either TI or TO below 55, S falls in Category 3.)	Au and/or RL above 55. (When both Au and RL are below 55, S falls into Category 3.)
3	Pattern average on first four scales ranges from 58 to 61 with TI or TO at 60 or above and the other above 50. (When either TI or TO below 50, S falls in Category 4.)	Au and/or RL above 50. (When both below 50, S goes into Category 4.)
4	Pattern averages 54 to 57 with TI or TO at 55 or above. (When neither TI nor TO are above 55, S falls in Category 5.)	Au and/or RL above 45. (When below 45, S falls in Category 5.)
5	Pattern averages 48 to 53 with TI or TO above 50. (When neither TI nor TO are above 50, S falls in Category 6.)	Au and RL above 45. (When both Au and RL are below 45, S falls in Category 6.)
6	Pattern averages 42 to 47 (or, with TI or TO above 55, and both Au and RL above 55, S is placed in Category 5.)	
7	Pattern averages ranging from 38 to 41 with TI or TO below 45. (When TI and TO both above 45, S falls in Category 6.)	
8	Pattern averages 37 or below with TI or TO below 40. (When TI and TO are both above 40, S falls into Category 7.)	

*This system of categorization was provided to Foothill Testing Officer, Dr. O. B. Nereson by Dr. Paul Heist and is appropriate to the Form D used in this study. There is no significant difference from that conversion system contained in the Manual, op. cit.

**Whenever the set of criteria are not met for a particular category, S falls in the category below.

APPENDIX D-1

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION - ALL VARIABLES, POPULATION I, n = 517

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-I
TI	1.000											
TO	.577	1.000										
ES	.625	.210	1.000									
CO	.474	.365	.434	1.000								
AU	.248	.236	.089	.423	1.000							
RL	.024	.272	-.002	.220	.417	1.000						
EN	.165	.012	.122	.096	.243	.062	1.000					
MA	-.015	.259	-.207	-.022	.163	.128	.198	1.000				
SS	.234	.179	.072	.147	.394	.090	.496	.386	1.000			
NS	.092	.260	-.061	.066	.296	.153	.306	.618	.610	1.000		
C	.124	.222	-.060	.060	.322	.122	.471	.795	.743	.878	1.000	
P-I	-.004	-.065	.013	.046	-.005	.033	.025	-.020	-.017	-.025	-.011	1.000

APPENDIX D-2

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION
SIGNIFICANT AT THE .05 LEVEL - POPULATION I, n = 517

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-I
TI	1.000											
TO	.577	1.000										
ES	.625	.210	1.000									
CO	.474	.365	.434	1.000								
AU	.248	.236	.089	.423	1.000							
RL		.272		.220	.417	1.000						
EN	.165		.122	.096	.243		1.000					
MA		.259	-.207		.163	.128	.198	1.000				
SS	.234	.179		.147	.394	.090	.496	.386	1.000			
NS	.092	.260			.296	.153	.306	.618	.610	1.000		
C	.124	.222			.322	.122	.471	.795	.743	.878	1.000	
P-I												1.000

APPENDIX D-3

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION SIGNIFICANT AT THE .01 LEVEL - POPULATION I, n = 517

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-I
TI	1.000											
TO	.577	1.000										
ES	.625	.210	1.000									
CO	.474	.365	.434	1.000								
AU	.248	.236		.423	1.000							
RL		.272		.220	.417	1.000						
EN	.165		.122		.243		1.000					
MA		.259	-.207		.163	.128	.198	1.000				
SS	.234	.179		.147	.394		.496	.386	1.000			
NS		.260			.296	.153	.306	.618	.610	1.000		
C	.124	.222			.322	.122	.471	.795	.743	.878	1.000	
P-I												1.000

APPENDIX D-4

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION - ALL VARIABLES, POPULATION II, n=401

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-II
TI	1.000											
TO	.620	1.000										
ES	.599	.206	1.000									
CO	.425	.439	.423	1.000								
AU	.369	.388	.231	.520	1.000							
RL	.043	.253	-.041	.284	.483	1.000						
EN	.136	-.034	.134	.088	.162	.050	1.000					
MA	-.029	.254	-.193	.050	.205	.162	.250	1.000				
SS	.283	.242	.161	.200	.395	.162	.526	.374	1.000			
NS	.143	.255	.065	.191	.370	.214	.500	.479	.641	1.000		
C	.169	.250	.049	.173	.375	.190	.601	.727	.812	.820	1.000	
P-II	.045	.042	.077	.041	.001	-.006	.041	-.075	-.002	.026	-.005	1.000

APPENDIX D-5

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION SIGNIFICANT AT THE .05 LEVEL - POPULATION II, n = 401

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-II
TI	1.000											
TO	.620	1.000										
ES	.599	.206	1.000									
CO	.425	.439	.423	1.000								
AU	.369	.388	.231	.520	1.000							
RL		.253		.284	.483	1.000						
EN	.136		.134	.088	.162		1.000					
MA		.254	-.193		.205	.162	.250	1.000				
SS	.283	.242	.161	.200	.395	.162	.526	.374	1.000			
NS	.143	.255		.191	.370	.214	.500	.479	.641	1.000		
C	.169	.250		.173	.375	.190	.601	.727	.812	.820	1.000	
P-II												1.000

APPENDIX D-6

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION SIGNIFICANT AT THE .01 LEVEL - POPULATION II, n = 401

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-II
TI	1.000											
TO	.620	1.000										
ES	.599	.206	1.000									
CO	.425	.439	.423	1.000								
AU	.369	.388	.231	.520	1.000							
RL		.253		.284	.483	1.000						
EN	.136		.134		.162		1.000					
MA		.254	-.193		.205	.162	.250	1.000				
SS	.283	.242	.161	.200	.395	.162	.526	.374	1.000			
NS	.143	.255		.191	.370	.214	.500	.479	.641	1.000		
C	.169	.250		.173	.375	.190	.601	.727	.812	.820	1.000	
P-II												1.000

APPENDIX D-7

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION - ALL VARIABLES, POPULATION III, n = 475

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-III
TI	1.000											
TO	.623	1.000										
ES	.601	.270	1.000									
CO	.411	.405	.371	1.000								
AU	.256	.381	.121	.463	1.000							
RL	.095	.301	.019	.274	.442	1.000						
EN	.093	-.002	.068	.078	.241	.030	1.000					
MA	.099	.373	-.059	.205	.359	.240	.334	1.000				
SS	.236	.231	.131	.215	.458	.238	.492	.506	1.000			
NS	.113	.269	.042	.164	.411	.242	.399	.546	.643	1.000		
C	.197	.314	.064	.235	.481	.262	.620	.778	.851	.810	1.000	
P-III	.042	.028	-.075	-.046	-.037	.069	-.008	.051	.036	-.015	.021	1.000

APPENDIX D-8

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION SIGNIFICANT AT THE .05 LEVEL - POPULATION III, n = 475

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-III
TI	1.000											
TO	.623	1.000										
ES	.601	.270	1.000									
CO	.411	.405	.371	1.000								
AU	.256	.381	.121	.463	1.000							
RL	.095	.301		.274	.442	1.000						
EN	.093			.078	.241		1.000					
MA	.099	.373		.205	.359	.240	.334	1.000				
SS	.236	.231	.131	.215	.458	.238	.492	.506	1.000			
NS	.113	.269		.164	.411	.242	.399	.546	.643	1.000		
C	.197	.314		.235	.481	.262	.620	.778	.851	.810	1.000	
P-III												1.000

APPENDIX D-9

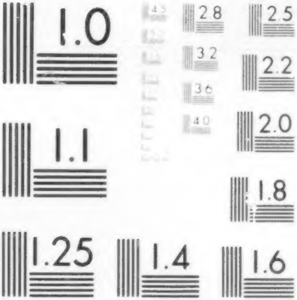
TABLE OF SIMPLE COEFFICIENTS OF CORRELATION
SIGNIFICANT AT THE .01 LEVEL - POPULATION III, n = 475

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 P-III
TI	1.000											
TO	.623	1.000										
ES	.601	.270	1.000									
CO	.411	.405	.371	1.000								
AU	.256	.381	.121	.463	1.000							
RL		.301		.274	.442	1.000						
EN					.241		1.000					
MA		.373		.205	.359	.240	.334	1.000				
SS	.236	.231	.131	.215	.458	.238	.492	.506	1.000			
NS	.113	.269		.164	.411	.242	.399	.546	.643	1.000		
C	.197	.314		.235	.481	.262	.620	.778	.851	.810	1.000	
P-III												1.000

APPENDIX D-10

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION
ALL VARIABLES, ALL SUBJECTS, n = 1393

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 GRP
TI	1.000											
TO	.604	1.000										
ES	.613	.230	1.000									
CO	.436	.397	.409	1.000								
AU	.295	.337	.150	.463	1.000							
RL	.054	.277	-.007	.257	.443	1.000						
EN	.154	.015	.125	.085	.244	.050	1.000					
MA	.044	.307	-.129	.072	.267	.172	.313	1.000				
SS	.265	.230	.135	.179	.435	.161	.544	.478	1.000			
NS	.133	.265	.027	.132	.377	.199	.433	.591	.661	1.000		
C	.184	.273	.035	.143	.410	.183	.595	.793	.822	.850	1.000	
GRP	-.070	-.102	-.044	.004	-.116	-.023	-.224	-.276	-.292	-.250	-.319	1.000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4.5
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

APPENDIX D-11

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION SIGNIFICANT AT THE .05 LEVEL - ALL SUBJECTS, n = 1393

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 GRP
TI	1.000											
TO	.604	1.000										
ES	.613	.230	1.000									
CO	.436	.397	.409	1.000								
AU	.295	.337	.150	.463	1.000							
RL		.277		.257	.443	1.000						
EN	.154		.125	.085	.244		1.000					
MA		.307	-.129	.072	.267	.172	.313	1.000				
SS	.265	.230	.135	.179	.435	.161	.544	.478	1.000			
NS	.133	.265		.132	.377	.199	.433	.591	.661	1.000		
C	.184	.273		.143	.410	.183	.595	.793	.822	.850	1.000	
GRP	-.070	-.102			-.116		-.224	-.276	-.292	-.250	-.319	1.000

APPENDIX D-12

TABLE OF SIMPLE COEFFICIENTS OF CORRELATION SIGNIFICANT AT THE .01 LEVEL - ALL SUBJECTS, n = 1393

	01 TI	02 TO	03 ES	04 CO	05 AU	06 RL	07 EN	08 MA	09 SS	10 NS	11 C	12 GRP
TI	1.000											
TO	.604	1.000										
ES	.613	.230	1.000									
CO	.436	.397	.409	1.000								
AU	.295	.337	.150	.463	1.000							
RL		.277		.257	.443	1.000						
EN	.154		.125	.085	.244		1.000					
MA		.307	-.129		.267	.172	.313	1.000				
SS	.265	.230	.135	.179	.435	.161	.544	.478	1.000			
NS	.133	.265		.132	.377	.199	.433	.591	.661	1.000		
C	.184	.273	.035	.143	.410	.183	.595	.793	.822	.850	1.000	
GRP		-.102			-.116		-.224	-.276	-.292	-.250	-.319	1.000

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